NATURE MAGAZINE

arch, 1944 35 Cents Vol. 37, No. 3

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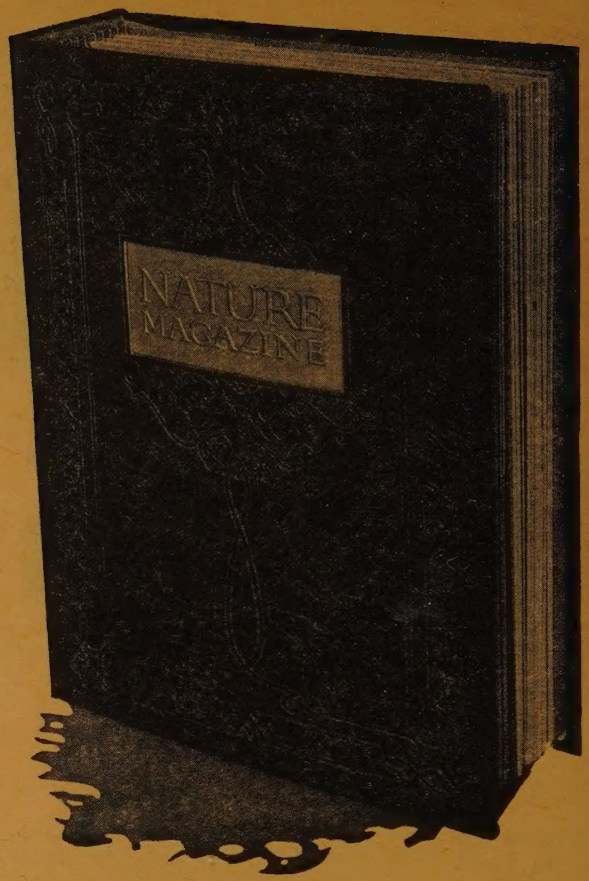

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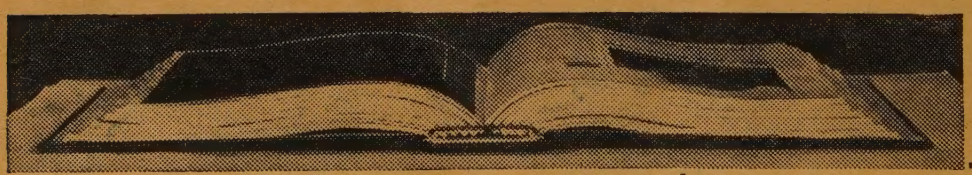

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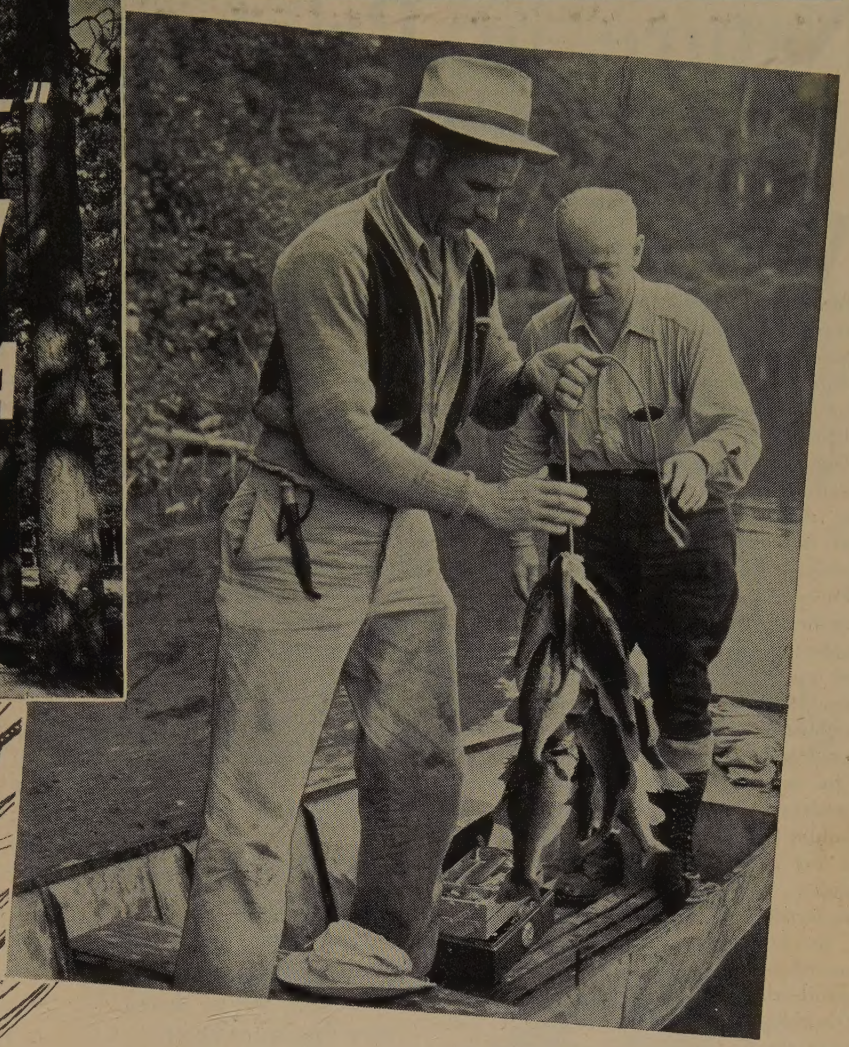

VACATION QUESTIONS AND ANSWERS

QUESTION: Is it patriotic to take a vacation next summer?

ANSWER: *Certainly! In fact Government officials recommend taking the right kind of a vacation.*

QUESTION: What is the right kind of vacation?

ANSWER: *One that minimizes the use of critical materials and vital transportation in reaching vacation spots . . . and the kind of vacation that will build you up and renew your energy for war work.*

QUESTION: What type of transportation shall I use?

ANSWER: *When the distance is not too great plan to travel by motor car, if your A card ration permits . . . and use B and C cards only as authorized. Use trains or buses sparingly on week ends. Cooperate with the efforts of your Government to maintain war transportation schedules.*

Of course, you can take a vacation this summer. You probably will need one more than you ever did in your life. Select a cabin in the woods. Stay put! Fish, canoe, sail and swim in the sky-blue waters of a Minnesota lake. This way you will not be using critical war transportation, but will be getting that much-needed change and rest. Let us help you now to pick that ideal vacation spot in the land of 10,000 Lakes.

Write to Minnesota Tourist Bureau, State Capitol, St. Paul, Minnesota.

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Nature in Print

By HOWARD ZAHNISER

WHEN total war involved the United States all public agencies promptly sought out the ways in which their activities could serve the Nation's belligerent purposes, and the spokesmen and writers on behalf of such agencies earnestly pointed out the wartime applications of many undertakings that an overzealous public looked upon with scepticism. There are some indications that the Nation has unnecessarily suffered long-time losses because these "redirections" of undertakings were in too many cases too drastic. The head of the United States Forest Service has, for example, pointed out a severe curtailment of research on forests in relation to stream flow, because of its supposed lack of importance in wartime, when at the same time hard-pressed Russia was sending delegations all the way to the Forest Service in this country to learn the results of such studies. Progress along many such lines has been sacrificed—unfortunately and unnecessarily—and the publication programs of many agencies have reflected in a regrettable way the extreme demands—or supposed demands—of the American public for complete mobilization for total war. There have seemed to be few tendencies on the part of the general public to view the war's totality in such a way as to see it involving and using, rather than displacing, fundamental undertakings for long-time progress.

In these circumstances it is especially interesting to see a series of excellent publications in which the Smithsonian Institution has both performed a wartime service and at the same time has persevered in its own characteristic endeavors "for the increase and diffusion of knowledge among men." Under the common title *Smithsonian Institution War Background Studies*, seventeen publications have so far been issued in this series and at least three more are projected. "The series," says the Secretary of the Institution in his Annual Report, "is filling a real need for authentic information on the less well-known peoples and regions involved in the war, and the demand for the books was so great that editions had to be increased progressively from 3500 [which, incidentally, is nearly twice the usual edition of Smithsonian papers] to 8000 copies. In addition both the Army and the Navy ordered editions of from 1000 to 10,000 copies of several of the papers for the use of service personnel."

Readers of this magazine will find these publications valuable and interesting. All the publications on far-away places serve many of the interests of *Nature Magazine* readers, and some of them are especially interesting because of their comments and illustrations of fauna and flora. Most notable in this respect is Ernest P. Walker's *Alaska: America's Continental Outpost.* Succinctly yet comprehensively, Mr. Walker describes the Territory's animal life in eleven of his fifty-seven pages, and nine of the thirty-nine photographs he has selected illustrate this discussion. Other natural resources are also described, and the entire publication is helpful to students of Alaska's natural scene.

Two of the series are of peculiar interest—Herbert Friedmann's *The Natural History of Camouflage,* and Doris M. Cochran's *Poisonous Reptiles of the World: A Wartime Handbook*—because they are definite contributions to the reader's understanding of natural history. Dr. Friedmann's paper, skillfully illustrated with selected photographs, and with the aid of Walter A. Weber's art, points out some of the types of camouflage and gives some idea of its complexity, "of its multiplicity of methods and approaches, and of the astonishing heights of deceptive efficiency it attains in many cases." Miss Cochran's handbook on reptiles will undoubtedly be long prized by those fortunate enough to possess it, for it serves an interest that was widespread even before many Americans found themselves facing the problem of avoiding poisonous snakes in all parts of the world and being prepared to deal with their venom.

Two other papers in this series are of outstanding interest for broader reasons. They are John R. Swanton's *The Evolution of Nations*—which concludes without any "absolute determinant" of governments but with a plea to make "personal worth and social service the measure of value between man and man instead of race, language, culture, or descent"—and the same author's explanatory and hopeful answer to the title-question: *Are Wars Inevitable?* War, he shows, "is an institution which has not always existed, is not equally developed in all parts of the world, is variously motivated, and is only one manifestation" of the human tendencies that are also shown in the riots, duels, street brawls, gangsterism, murder, theft, and other aspects of violence that have already come under the control of law and the police forces. It is not only the conclusions of this paper that are impressive, but more especially the fact that they are derived inductively from a study of human experience and not alone from a reasoning idealism.

Through a better understanding of Nature—through science—we may the better equip ourselves for solving our most terrible international (and personal) problem. Dr. Swanton is an ethnologist with a most helpful knowledge of basic experience in the past. He concludes his treatise on nations with a quotation from the scientist Louis Pasteur, whose "invincible belief" was "that science and peace will triumph over ignorance and war."

Readers will be grateful, indeed, for this series of war studies that includes such an emphasis on the background hopes for the future use of law-supporting force without the waste of human and natural resources that is war. Their detailed gratitude will be apparent with a reading of the following list:

Smithsonian Institution War Background Studies. Washington, D. C. Smithsonian Institution. Free.

No. 1. *Origin of the Far Eastern Civilizations: A Brief Handbook.* By Carl Whiting Bishop. June 10, 1942. 53 pp., with 24 photographs on 12 plates, 21 figures, and bibliography.

No. 2. *The Evolution of Nations.* By John R. Swanton. June 24, 1942. 23 pp.

No. 3. *The Peoples of the Soviet Union.* By Aleš Hrdlička. July 15, 1942. 29 pp.

No. 4. *Peoples of the Philippines.* By Herbert W. Krieger. Nov. 13, 1942. 86 pp., with 45 photographs on 24 plates, 4 maps, and bibliography.

No. 5. *The Natural-History Background of Camouflage.* By Herbert Friedmann. December 11, 1942. 17 pp., with 16 plates of 6 drawings by Walter A. Weber and 21 photographs.

No. 6. *Polynesians: Explorers of the Pacific.* By J. E. Weckler, Jr. Jan. 13, 1943. 77 pp., with 38 photographs on 20

Fog

By ETHEL ROMIG FULLER

It started off to seaward,
Wisps of gossamer;
Inland blown, swathed hillsides
With stuff like damp white fur.
Spun ever, wetter, denser,
Soon was so compact
No near bush loomed; no fence post,
To prove a farm a fact.

Familiar sounds were muted—
Even cowbells seemed
Elfin chimes, a man once
Back in boyhood dreamed;
A man who, though well knowing
The road he walked home on,
Stumbled, lost and blinded,
Through this phenomenon.

plates, tipped-in map of the South Pacific Ocean, drawing of coral atoll, bibliography, and appendix of "pertinent facts about the main island groups in Polynesia."

No. 7. *The Japanese.* By John F. Embree. Jan. 23, 1943. 43 pp., with 30 photographs on 16 plates, 3 text figures, bibliography, appendix of "facts and figures."

No. 8. *Siam—Land of Free Men.* By H. G. Deignan. Feb. 5, 1943. 18 pp., with 16 photographs on 8 plates and a text map.

No. 9. *The Native Peoples of New Guinea.* By M. W. Stirling. Feb. 16, 1943. 25 pp., with 76 photographs on 28 plates, text map, and bibliography.

No. 10. *Poisonous Reptiles of the World: A Wartime Handbook.* By Doris M. Cochran. March 19, 1943. 37 pp., with 1 color plate, 31 photographs on 16 plates, 2 text figures, bibliography, and appendix on first aid, antivenin, and directions for making scientific collections.

No. 11. *Egypt and the Suez Canal.* By Frank H. H. Roberts, Jr. March 31, 1943. 68 pp., with 45 photographs on 25 plates, text map, and bibliography.

No. 12. *Are Wars Inevitable?* By John R. Swanton. May 11, 1943. 36 pp., with 69 "references."

No. 13. *Alaska: America's Continental Frontier Outpost.* By Ernest P. Walker. July 8, 1943. 57 pp., with 39 photographs on 21 plates, tipped-in map, text map, and bibliography.

No. 14. *Islands and Peoples of the Indies.* By Raymond Kennedy. Aug. 5, 1943. 66 pp., with 41 photographs on 21 plates, tipped-in map, 6 text maps, and bibliography.

No. 15. *Iceland and Greenland.* By Austin H. Clark. Aug. 19, 1943. 103 pp., with 41 photographs on 21 plates, 2 text maps, and bibliographies.

No. 16. *Island Peoples of the Western Pacific: Micronesia and Melanesia.* By Herbert W. Krieger. Sept 15, 1943. 104 pp., with 39 photographs on 21 plates, 2 text maps, and bibliography.

No. 17. *Burma—Gateway to China.* By H. G. Deignan. Oct. 29, 1943. 21 pp., with 32 photographs on 16 plates, text map, and bibliography.

These are in practically all libraries, and readers themselves can get copies of the ones in which they are most interested, although the editions are necessarily too small for extravagant distribution. Requests for complete sets of the series are not welcomed.

Australian Poster

Australia is very much awake to the interest and attraction of its wildlife. The Australian News and Information Bureau, 610 5th Ave., New York 20, N. Y., has brought out a poster and accompanying key picturing the cockatoo, emu, platypus, kookaburra, opossum, kangaroo, goanna, koala and lyre bird. It is available free to schools, libraries and similar educational institutions.

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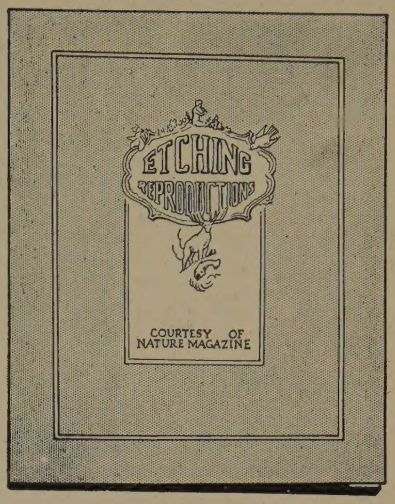

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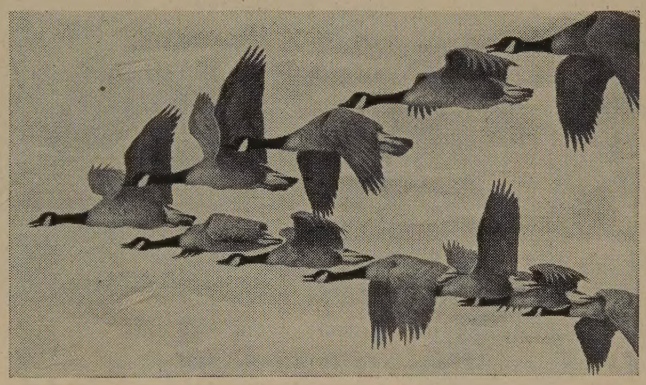

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To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and Devoted to the Practical Conservation of the Great National Resources of America

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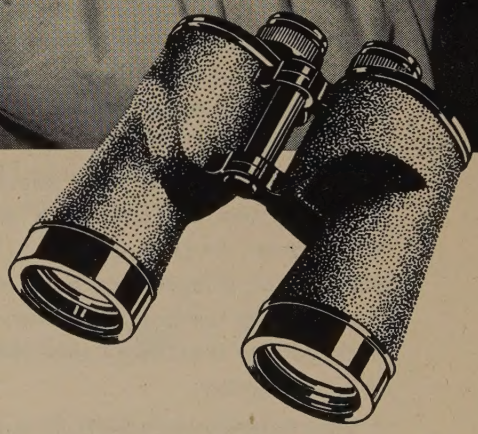
Based on this redesign, both the Army and Navy now specify that *all* binoculars supplied to them be of waterproof construction.

Facilities of this plant—developed through 90 years of service to outdoor enthusiasts, to science and industry—are busy today fighting a war. After Victory new miracles of optical science for better living will come from the drafting tables, the glass furnaces and the precision finishing rooms of Bausch & Lomb, optical headquarters of America.



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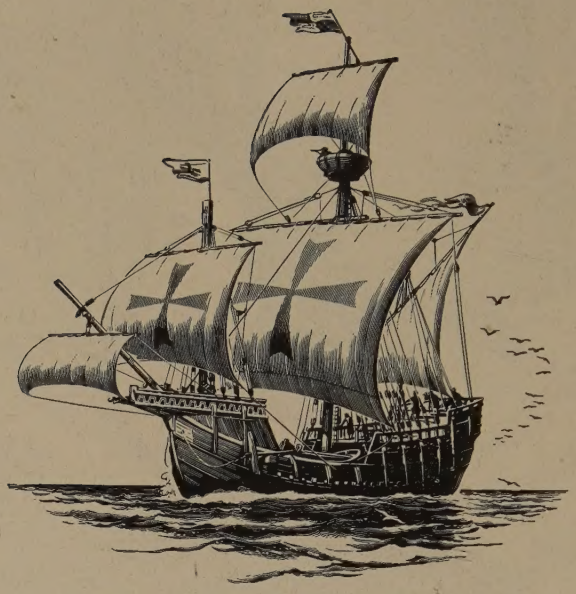


THERE ARE STILL

UNDISCOVERED CONTINENTS

COLUMBUS had a definite goal—a westbound sea route to Asia. But what he found was a new continent—a new source of Nature's wealth.

Modern research also has its goals: it, too, is discovering new resources. Starting from the knowns of science, it charts its voyages into the unknown. Behind each voyage is a theory that there is a passageway.

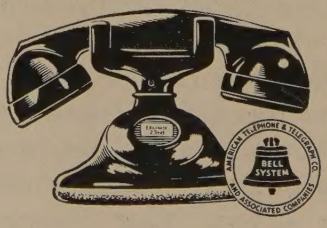
But research doesn't hold stubbornly to its theories. If it finds islands instead of a continent, it accepts them, for it expects the unexpected. It studies their relation to the known lands of science. And on the basis of its increased knowledge, it makes revised plans for progress. In science there is always a continent ahead.

Just what research will disclose can never be forecast. But history has proved that from research flow discoveries of value to mankind. From Bell Telephone Laboratories there has poured a full stream of improvements in the telephone art.

Bell Telephone Laboratories has kept America leading the world in telephony. And its researches have contributed importantly to other arts of communication—to the phonograph and sound-motion pictures, to radio broadcasting and television.

Today, as ever since Pearl Harbor, its efforts in research and design are devoted to the war needs of the nation.

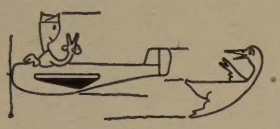
When peace comes, its organized teams of research scientists and engineers will continue to explore and invent and perfect for the improvement of telephony.



BELL TELEPHONE SYSTEM

Contents Noted

Suffering from a serious attack of botulism, an American pintail drake was hospitalized at the Bear River Migratory Bird Refuge hospital in northeastern Utah, in the summer of 1942. By August 15, the bird had regained its health and, with band 40-693910 on its leg, was released. Eighty-two days later a flock of wild ducks of two species set down on Palmyra Island, some 1100 miles south of Honolulu and some 3600 miles from the Bear River Marshes. Among them, reported Ensign Arthur R. Murphy from this Pacific outpost, was the pintail from Utah. The birds were exhausted when they arrived but were put under wire, fed and rested. F. C. Lincoln of the Fish and Wildlife Service believes that the condition of the birds suggests that they had made a three-thousand mile flight over water, and that Palmyra was the first "land fall" they had made. That is mighty nice flying and navigating, even for a Fortress pilot.



Birds usually get important credit for seed dispersal, but Burton N. Gates says a word for the ants. Experimenting with eight species of ants, he found that they were attracted to the seeds of six species of trillium and seeds of castor bean, violets and bloodroot. They were not interested in the seeds, however, but in the little fleshy knobs on these seeds where they are attached to the parent plant. These are caruncles and the ants gnaw them off and discard the rest. Thus, says Mr. Gates, colonies of these plants spring up at some distance from the parent plants.

Hunting licenses during the 1942-43 season—war or no war—added up to 8,049,537, according to a preliminary report from the Fish and Wildlife Service. This represents a decrease of 5.2 percent in the number of license holders compared with the previous season, and of 3.2 percent in revenue from the sale. For obvious reasons licenses for the 1943-44 season are expected to show further decline—how much is anybody's guess. But fish and game officials are expecting a tremendous increase when the boys come home. We wonder. Could it be that a lot of the boys are going to be pretty well fed up with killing? And there may be a lot in what the gentle Ernie Pyle, long our favorite columnist and war correspondent, says when he writes: "I don't see how any survivor of war can ever be cruel to anything, ever again."

We like the way Frederick S. Chase, of Waterbury, Connecticut, took to meet the threat of rural billboard invasion of the lovely countryside around his farm. He waited for no laws but talked the problem over with his neighbors. Then each landowner signed a legal agreement expressing the desire to keep the land in its present state of beauty, and agreed never to permit its use for commercial purposes. The covenant runs with the land and binds heirs, assigns and successors. This, it seems to us, is meeting a problem head-on. We understand, too, that a copy of this document is available.

Welcome to a new member and reader, Her Majesty Queen Farida, to whom each issue of *Nature Magazine* now goes at Ardine Palace, Cairo, Egypt. Also, the late Queen Marie of Rumania was long an interested reader. Yes, we do get around. In the same mail with the remittance from the lovely Queen of Egypt came one from the Secretary of the Royal Society of Tasmania, Hobart, Tasmania. And Nature inquiries and comments trickle in from the far corners of the world from men in the service who have just discovered the magazine.

Recently we have had suggestions from conservation friends urging us to campaign right now for the creation of a fjord national park in Alaska, for the creation of national monuments out of two California peaks, for a seashore national park in the Carolinas. Naturally we are sympathetic with any justifiable project of this sort, but we have not felt that this is the moment to proselyte for them. Conservation cannot, of course, take a holiday in wartime. It is too vital. But we cannot feel that it is wise to go beyond tabbing such ideas for future consideration. What do you think?

R.W.W.

Coyotes range far to the North, as this one on the alert against a fairy-like background in Jasper National Park, Canada.

Although the hand of man is against him, he survives because there seems no end to—

Coyote Cunning

By LEWIS NORDYKE

THE sly coyote that chatters and howls from lonely western hillsides tonight is probably boasting of another victory. He has been hounded more than any other American animal; every device and trick known to man—financed by local, state and federal government—has been used in a long and unceasing battle to eradicate him. Fifty thousand to 100,000 are killed annually in this country, but the little wolf is holding his own, and has spread from his original haunts in the prairies and mountains of the West to many a new neighborhood. Today at least 2,000,000 roam the western United States looking for a mess of poultry or juicy lamb; many of them will likely get it, too.

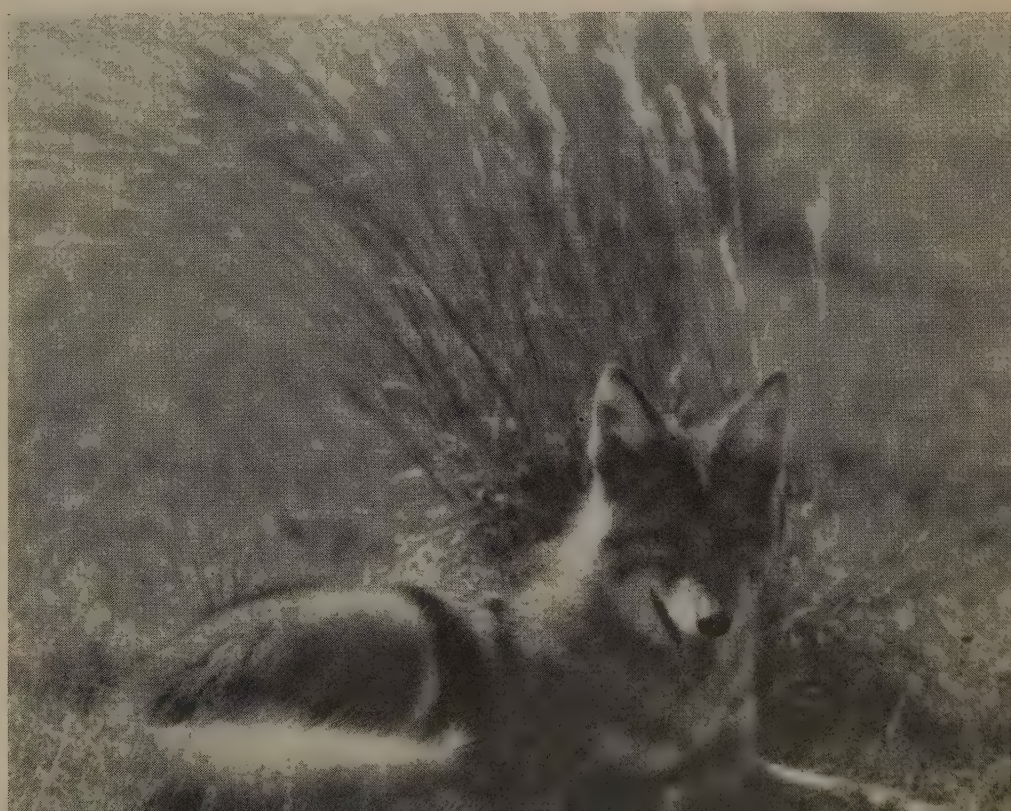
The coyote could retreat to the vast ranches and rough wastelands and live in comparative peace, but that does not suit him. He is a sagacious fellow; he delights in living among his enemies, matching wits with them and daringly feasting on the food they produce.

A top-notch government trapper who found every one of his three dozen traps sprung and robbed of bait recently remarked: "The coyote is the smartest varmint alive." A farmer who saw all the ripe watermelons in his patch opened and partly eaten had other descriptive words; but he did wonder why the thief had not tried at least one green melon. There is a very good answer. Biologists of the Wildlife Service of the U. S. Department of Interior have never found a single instance of a coyote's having bitten a green watermelon.

The coyote is a yellowish-gray animal resembling a small police dog. He seldom weighs more than thirty pounds. His speed has been clocked at forty miles an hour by an automobile. Scientists have named him *Canis latrans,* and describe him as a lower or inferior member of the wolf family. That makes life no less dear to him. He thrives in regions in which the reputedly braver, wiser and more ferocious lobo is extinct. The government pays trappers to try to thin out the coyote in places where even Reynard, the Fox, is unable to exist.

The immortal Reynard of our childhood literature never got by with a trick as clever as one pulled by Tippy, a pet coyote reared by a family in Texas. Tippy's liking for fresh poultry stuck with him in captivity, and he began catching chickens. The family chained Tippy to a corner of the house and fed him scraps. Tippy promptly scattered the scraps within the length of his chain and retired around the corner. The gullible chickens ventured forth to pick up the scraps; Tippy picked up fresh poultry.

A fat coyote is seldom, if ever, seen. Regardless of the abundance of food, he stays in top condition for the running and fighting he knows he must do. As a fighter he is quick as lightning and has a devilish trick of dragging his teeth through the flesh of any enemy he bites; a dog rarely asks for a second help-



Kywoitin was a coyote raised from a pup by the late Lorene Squire. He never answered the call of the wild.

ing. But he fights only in emergencies, preferring to use cunning, either instinctive or developed.

A rancher walking or riding about his place without a gun may see coyotes at close range. He takes his gun the next time—and does not see a single one. Trappers for the Wildlife Service say the coyote's keen sense of smell detects the gun. Steward Edward White disagrees; he thinks it is a sort of telepathic sense of which man knows nothing.

The notion that the coyote possesses an almost supernatural sense is not new. Before Columbus discovered America, the inhabitants of Mexico recognized his cunning and often decorated their sculpture with the likeness of the smart little beast's head. And in Mexico today he lives in folklore and literature. He is still very much alive, too, and still respected by man. Natives tell of watching a coyote under trees in which turkeys or other birds are roosting. By madly chasing his tail he makes the birds so dizzy they drop off the roost.

The coyote may have no supernatural gifts. He does not need them; his good common sense is enough. He knows how to stalk unsuspecting badgers that are excavating some smaller animal's burrow in order to make a meal of it. The quick coyote grabs the rodent unearthed by the laboring badger. He watches buzzards and birds of prey—and takes their kill or the food they find. But he knows how far he can safely go in the business of making beast and bird provide his food; experienced hunters say they have never heard of a coyote eating the kill of a mountain lion. In his way of thinking, it does not contribute to longevity to start an unnecessary fight. Besides, there are other ways of getting something to eat.

A coyote profile, showing the keen and alert pose that is so characteristic of this interesting animal.

Coyotes began to scavenge the highways soon after they learned that travelers tossed out scraps, and that traffic on the highways killed rodents and birds. The coyote would prefer poultry or lamb, but such morsels are not essential; he does well on any food man produces, and on many that man would not touch, such as snakes, lizards and insects. Even shoe leather makes an emergency diet. When he can get it, the coyote often eats fruit for dessert.

Vernon Bailey, veteran Wildlife Service naturalist, reporting in 1936 on the stomach contents of 450 coyotes taken in Oregon, found that 177 had eaten wild rabbits, including all the species, and 137 had accounted for other miscellaneous rodents. His conclusions are that the coyotes "may serve a useful purpose in checking overabundance of jack rabbits, cottontails, ground squirrels, woodchucks, gophers, meadow mice and other small rodents. . . . Still, in times of greatest abundance of these pests they have not prevented serious plagues of rabbits, meadow mice and ground squirrels."

At the moment, a great many coyotes have their minds on the garbage scraps and other advantages of military reservations. The adaptable little animal makes it his business to look into such things. A Texas bombing range was constructed in a vicinity thick with coyotes. When the planes roared over and the practice bombs whistled down, the situation seemed none too healthful and they departed. But being home-loving animals they ventured back to investigate the damage. Things did not look so bad after all, and they stayed. They den on the range, paying little attention to the bombers, thanks to which there are no longer any hunters, trappers or dogs.

The almost human family life of the coyote contributes much to his ability to live and increase in a world of enemies. He is perhaps the most moral and home-loving animal in the world. He lives in a den dug in a bluff, under an overhanging rock, or beneath a stump; the den is located within range of a food supply. In most cases there are two dens, one for the mother and the young, and the other for the father.

Wildlife Service researchers are convinced that coyotes mate for at least a year and perhaps for life, because they have seen the same ones living and fighting together for long periods, and they have witnessed some mighty tooth and claw combats when "bachelor" coyotes attempted to interfere with family life.

They have seen half a dozen males after one young female. The main method of courting was bloody fighting among the suitors. After a short time the female paired off with a male and the rest departed.

Apparently the female has something to do with the selection, and she does not always pick the best fighter; some of them pick the male that receives the most decisive licking.

The coyote breeds only once a year, in litters of from four to ten. There is strict discipline in the coyote home. The first thing a pup learns is that danger is near every instant he lives; then he is taught to hunt food and to fight. Under no circumstance will the pups cross the out-of-bounds line around the den. A pup, which resembles the awkward young of a police dog, is like a child; it wants to run to meet daddy. Snooping biologists have seen the father trot along the rim of a foothill; the pups spy him and tumble over each other running to meet him. But, regardless of how far away the father may be, they halt at a fixed spot as if it were a latched screen door stopping a child. This has been observed repeatedly; the deadline in every instance was approximately fifty yards from the den.

The pups nurse two weeks; then they are taken out one by one, usually by the father, and taught to hunt. They start on large insects, such as grasshoppers, and graduate to field mice and rabbits. Next the parents watch the pups fight among themselves, and occasionally step in to show them how it is done. Parents keep their young under close protection until the pups are almost a year old and practically grown.

It is doubtful whether the young of any other wild animal have such good care. Their parents know a lot about sanitation. Some dens explored by hunters were well ventilated in the back through a hole dug to the top of the ground. A Wildlife Service observer saw parent coyotes rolling their young in the sand, watched them, and saw that the coyotes did not return to the old den but dug a new one not far away. The observer investigated the old den; it was alive with fleas. The sand rolling and the removal to a new den were obviously efforts to get rid of the fleas.

The father is the boss and protector in the coyote home; he is larger than the female and apparently a thoughtful husband. While a government trapper was watching a den late one afternoon, a pair of coyotes ventured out. The female was heavy with young and could do little more than trot. The male caught a jackrabbit and took it to his mate; then he rustled food for himself. When the pups are very young, the father gathers all the food.

More than one observer has seen the male dash almost into the teeth of howling dogs and lead them away from the den. When trailing dogs get within a mile of a coyote's home the male takes up the chase and leads them away. In several instances E. G. Pope

The coyote blends with the background of the plains country as it stands on the alert surveying the possibilities of catching a meal.

of the Wildlife Service saw dogs jump the female when she was prowling far from the den; the male cut in until he got the dogs after him; the female escaped. Once Pope watched the action of a male after the mother was killed. The father caught rabbits and other food in the vicinity; he gorged himself and returned and regurgitated the partly-digested food for the young.

Two coyotes, resting and running in relays, can wear down a jackrabbit in a short time. And many a pack of trailing hounds has been confounded by the team-work of a pair of coyotes. One takes on the dogs for a while and drops down to rest; then the other has his turn. They back-track, cross-track and break their trails in streams. It is not unusual for trailing dogs, even well-trained ones, to end by running in circles while the coyotes escape. At times this seems more like daring sport than a self-protection maneuver.

Biologists and researchers did not wear out their patience studying the coyote just to be able to tell the world of his guile; they did it in order to keep him within bounds. They make use of all the coyote's habits and cunning to destroy him. Coyotes communicate by sniffing grass where others have been; trappers use sex scent or parts of the body of captured coyotes as bait. This has proved successful to a degree, particularly at mating time; the bait makes the male lose his judgment. But in trapping for pairs of coyotes all the scents taken from other coyotes are useless.

Government trappers have trailed a single coyote as long as a year before finally catching him. More than one trapper has discovered that the wily beast recognized him as a special enemy and avoided him and his traps to the point where he could not make a catch with all his tricks, hard as he might try.

In the open country of the West the man with trained greyhounds is the worst enemy of the coyote; the swift hounds can quickly dispatch him once they sight him. But the coyote has learned something about that. D. M. Bentley, who has chased coyotes with greyhounds in the Texas Plains country for years, last winter saw coyotes wallow in weeds until their fur was stained the exact color of the weeds. When there was a chase the coyote took to the weeds. In many a case, his camouflage confounded the greyhounds, who do not hunt by scent. Coyotes have been known to jump on automobiles and flat cars to escape pursuing hounds. The coyote can be depended upon to develop a new defense for every new attack.

If the going gets too hot or food grows scarce the coyote moves on to new country and soon makes himself at home. Before the war, tourists from eastern states frequently bought or found coyote pups in the West, and took them home as pets. The pets usually escaped. Sportsmen have picked up coyotes and taken them to various parts of the country for the purpose of chasing them with hounds. Through these kidnapings and through natural migration the coyote has spread far from his ancestral haunts.

If on some dark midnight you hear a horrible, spine-tingling howl, you need not close the door; the coyote will not harm you. Anyway, he is farther or nearer than he sounds and you can not find him.

But whether it is a howl of triumph, a call to a mate, or a warning of some danger, the other coyotes understand. If you listen closely, you may hear faint howls in the distance; the coyotes are relaying the message. Man has determined that coyotes have a relay system of communication, but he can not decode the messages which must remain a secret of Nature.

★

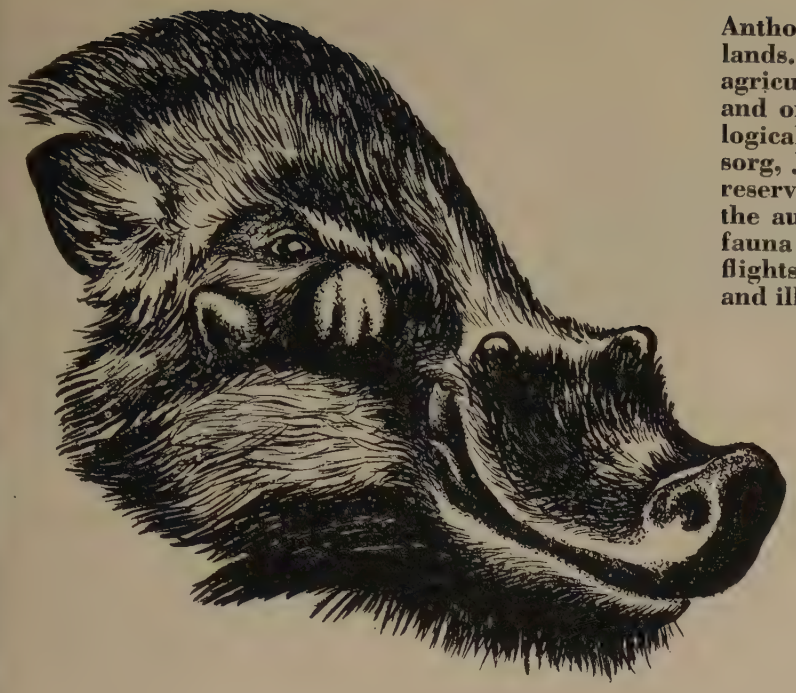
How Wise Is the Owl

By ORLO EVAN WHEELER

I question your wisdom; you sit there and stare,
You blink and revolve your big glassy eyes.
Why pose as a seer?
Pure bluffing, you rascal, you humbug up there,
Mankind has been duped, you merely look wise.
You're just a bit queer.
"WHO? WHO-O-O? 'T'S YOU. 'T'S YOU-U-U."

You wander at night when hobgoblins glare,
Then skulk at midday like a stupid clodpoll.
Why hide when it's sunny?
When houses have windows with daylight to spare,
Why dwell in a barn or a woodpecker hole?
You act kind of funny.
"WHO? WHO-O-O? 'T'S YOU. 'T'S YOU-U-U."

You eat such queer things, the folks at your house;
For entree a beetle, a shrew your hors d'oeuvre,
I should think you would croak;
Your piece de resistance a gopher or mouse,
Grasshopper dessert, perchance, you will serve.
I think you're a joke.
"WHO? WHO-O-O? 'T'S YOU. 'T'S YOU-U-U."



Anthony de Vos flies under the flag of the Netherlands. Before the war he specialized in tropical agriculture, biology and art; then served for two and one-half years as a staff member of the Zoological Museum and Botanical Gardens at Buitensorg, Java. He made expeditions into many of the reservations in the Netherlands East Indies, and is the author of numerous articles on the flora and fauna of the islands. Between absences on ferry flights, Licutenant de Vos found time to prepare and illustrate this article. He has now left for combat duty overseas.

The wart hog on the island of Java is believed to be in danger of reduction from the small numbers remaining when the Japanese invaded the Indies isles.

Japanese invasion draws veil over Holland's conservation program and raises question—

What of East Indies Wildlife?

By ANTHONY DE VOS

PALEMBANG, Soerabaja, Macassar, Celebes, Molucca, Amboina, Koepang. Until the fateful final days of 1941, and the early weeks of 1942, these names meant little to the majority of people. Then they leaped into the news as Japanese swarms descended upon the Netherlands Indies. For these are all names of islands or cities in the great Malay Archipelago, which stretches for three thousand miles from the western tip of Sumatra to the border between British and Dutch New Guinea.

Rich in the traditional wealth of the Indies, these many islands held great lure for the Nipponese in their greedy aggression. There the invader found food, minerals and other treasures with which to implement his conquest. There, also, he found seventy million native people of forty tribes, and, at the time of invasion, some two hundred thousand Hollanders. Then the curtain was drawn over the Indies scene, and all that is known of what is now going on comes from those few who have made their way to Australia and to other points now held by the United Nations.

Hornbills on Borneo and Sumatra need protection to survive.

Besides their vast economic wealth, the islands are rich in natural beauty and wildlife in great variety. To protect scenic and historic areas and the rarer forms of animal life, the Netherlands Government had set aside seventy reservations, planned in the fashion of the national parks and wildlife refuges of the United States and Canada.

What has happened to these areas, and, in particular, to the wildlife in them, must be largely a matter of conjecture. It is known, however, that the Japanese are cutting virgin forests for wood, and that this may threaten several rare animals with extinction, especially on Java. Also the invader is known to be ruthlessly robbing the natives of their food supplies for export to Japan, leaving the people close to starvation. With no legal protection for wildlife, it is inevitable that it will be slaughtered on a large scale for food. So, for many species in the East Indies, the future looks dark. The longer the intruders remain the darker it will be.

Java supports fifty million people in an area about the size of an average

The clouded leopard, partially a dweller in the trees, is found on the island of Sumatra. Fear for its safety is felt now that protection by the Netherlands Government has been withdrawn.

American state. Thus, among the islands of the world, it is second only to Japan in the density of its population. Under such conditions the necessity for national reservations is obvious. Under former rule several volcano summits had been set aside, a large park had been reserved in western Java, and several smaller ones in the eastern part of the island. To protect the fauna and flora of the plains section, which is so different from that of the mountains, a number of small preserves had been created.

In the western Java park the one-horned rhinoceros was being preserved from extinction. Within this area is ideal swampy habitat where tropical diseases are too rampant for human occupation. These ills do not affect the rhino, and, with complete protection, the dozen or so of these animals still living on the island when the park was established had increased to about thirty in 1941. What their fate may have been at the hands of the Japanese is uncertain. It is known that there is an oriental demand for the skins of these animals. Also their horns are sought because it is believed that powdered rhino horn gives one strength.

Companion of the rhino in its reservation is the banteng, or wild ox, which is still fairly common. Since this animal is both shy and ferocious, it has a fair chance of surviving the Japanese invasion. It has also been domesticated on the island of Bali, but, unfortunately, has inter-bred with native cattle. Less hope may be held out for the Java deer, which is nowhere common, and is badly in need of complete and careful protection. On the little island of Bawean, north of Java, a few deer of a species differing from any others in the Indies may also be on the verge of extinction.

The silvery gibbon is the only ape on Java. It is not common anywhere, but so long as there is any virgin jungle left it has an excellent chance of survival. Not so fortunate, however, is the wart hog, already much reduced in numbers and now, certainly, facing still further reduction. Another wild hog, *Sus scrofa*, closely related to the wild boar of Europe, is still common.

Among the larger cats on Java are two races of tigers, one in the remote east and the other in the far west. They differ in some respects, but both share the hatred of the natives, who mistakenly regard them as man-eaters and kill them at every opportunity. Another feline, the fishing cat, was discovered only about twenty-five years ago within the western East Indies. Little is known about this medium-sized cat except that it occurs in the vicinity of rivers on the northwest coast of the island, and that it lives largely on a fish diet.

Related to the sea otter of the northern Pacific, and similar in habits, is an otter found in the coastal waters of northern Java. It is extremely rare and little is known about it. The island can also claim the distinction of having the world's largest squirrel, about equal in size to the average house cat. It is rare, but being an inhabitant of the mountains of medium height in western Java it has a fair chance of survival.

One of the strangest animals on this Indies island is the binturong, or "bear marten." Its body is typically marten-like in shape, but its head is definitely bear-like. Omnivorous and nocturnal, this animal gets about slowly with the aid of its prehensile tail. It is becoming rare because it is easily caught by the natives. Javanese also are destroying the pangolin, or scaly anteater, for its valuable skin, and it is becoming rare.

The two-horned rhino on the island of Sumatra was formerly common but has become rare in the last quarter-century. It is difficult to protect.

Among the Java birds that badly need protection to survive — and now have none—are the hornbills, egrets, ibises and the Javanese stork. Reservations held out a hopeful future for them before the little men of the Rising Sun arrived.

Much hope for the typical wildlife on the island was encouraged by the establishment, in southern Sumatra, of the largest park reserved in the Netherlands East Indies. Here a large area of virgin jungle was set aside for elephants, rhinoceroses, water buffaloes and tapirs, among other animals. In north

A resident of the regions of the rivers in south and middle Borneo is the strange proboscis monkey, the male of which has a long, hanging nose.

Sumatra a special reservation was dedicated to the orang-utan, and two volcano tops in the west-central part of the island were given over to protection of the native mountain goat. The quarter-century before the Jap invasion had seen intensive development of the island, and the establishment of plantations, and sharp inroads in the areas of virgin forest caused a serious diminution among the larger mammals.

During this twenty-five-year period the two-horned rhino, formerly common, has become rare. The species is difficult to protect because it is quite a wanderer, and is invariably killed when it turns up in inhabited regions. Water buffaloes of the wild, distinguished from their domesticated relatives by a wider spread of horn, are found only locally in south Sumatra. Also given to wandering are the elephants, which do damage to plantations, and particularly to young rubber trees. Because of this, they are diminishing in numbers. The government could protect them only in parks, but they care nothing for boundaries.

Shy and inoffensive animals, the tapirs are found all over Sumatra, but are nowhere common. They seek out remote places, however, and do not roam widely, keeping in the vicinity of water. Also shy and nowhere abundant is the sambur or water deer, the largest true deer and an inhabitant of the wooded plains. The Malayan bear is still quite common all over Sumatra, a small but pugnacious and aggressive fellow.

The species of mountain goat found on Sumatra is peculiar to that island. It has not been ascertained to which Asiatic goat these animals are most closely related. Their hope for survival rests largely on the fact that they are extremely difficult targets.

Zoological parks are extremely fond of orang-utans, and this demand had made serious inroads into the population on Sumatra. Sometimes as many as fifty were collected and exported at one time. To halt this a special orang-utan park was set aside. The gibbons are represented by several species, and are common in the lower jungle forests.

Two Sumatran cats are very rare and may not survive, now that protection has been withdrawn. One is the clouded leopard, a semi-arboreal species entirely different from the common leopard, and the other is the beautiful golden cat, found only on the island of Sumatra.

The Java hog, a wild hog related to the wild boar of Europe, is still common and should survive unless it is too extensively killed for food.

Less fear is held for the fate of the wildlife on the island of Borneo, because this is still largely virgin jungle. Two-horned rhinos are still common; elephants and bantengs—probably imported—roam in rather large herds; samburs are widespread but not common, and clouded leopards are still fairly common, although the native chiefs prize their tails and skins for ornament.

Borneo has a good supply of apes, including an orang-utan, the male of which has a huge throat-sac. The orangs, while widely-distributed, are not as common as the gibbons, of which there are several species. Along the larger rivers of south and middle Borneo is found the proboscis monkey, distinguished by the long, hanging nose of the male. It lives only on Borneo. Also peculiar to that island, and to Java and Sumatra, is the strange-looking tarsier, a nocturnal half-monkey the size of a small rat. It has huge eyes, a long, tufted tail, and disks on its fingers, with which it clings to trees. It is very elusive.

Among the birds needing complete protection on Borneo, and on Sumatra, are the Argus pheasant, and the hornbills, of which there are several beautiful species.

Curiously, the island of Celebes boasts more species shared with no other place than any other island in the Malayan Archipelago. Among these is the anoa or pigmy buffalo, the smallest wild buffalo. It has

sharp-pointed, straight horns, which it uses for ferocious attack. Another exclusive species is the babirusa, or pig deer, so named because of its long, upward-curled tusks that from a distance look like antlers. The tusks that grow from the upper jaws have their bases surrounded by the flesh of the lips, and are as long as the lower tusks.

On the much-publicized island of Bali is found the Bali tiger, a race that appears to belong to Bali alone. The largest tiger skull ever collected was found there.

Birds of paradise on battle-scarred New Guinea greatly need protection.

The islands of Komodo and Soembawa share sole proprietorship of the Komodo dragon, the world's largest living lizard. It was well protected up to the time of the invasion, but its fate is now uncertain.

On battle-scarred New Guinea is a real marsupial fauna similar to that of Australia, but some species have been forced to adopt an arboreal life by the dense tree growth of the island. There is also a varied bird life, including birds of paradise, crowned pigeons, and cassowaries. The Netherlands Government had planned the creation of a large wildlife National Park on Dutch Guinea when the war interfered.

To cover all the varied and interesting wildlife native to the many islands of the Netherlands Indies would require many more pages than this copy of the magazine—or many copies—provide. And there is still much to be learned about many of these species, as well as how they may all be perpetuated through protection and the reservation of sufficient and proper habitat for them. Real progress was being made when dreams of empire brought the invader from the north. Protection will be continued when he has been driven away, and it is hoped that, in the interim, the devastation of war will not have been fatal to a single species of their wildlife.

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Two Against Nature

By WILLARD HALLAM BONNER

A common misconception is that all poets are fond—rather indiscriminately fond—of Nature. Perhaps this has come about because we have made so much of Nature poetry. All poets, like all other people, do not necessarily conform. There are some famous protests.

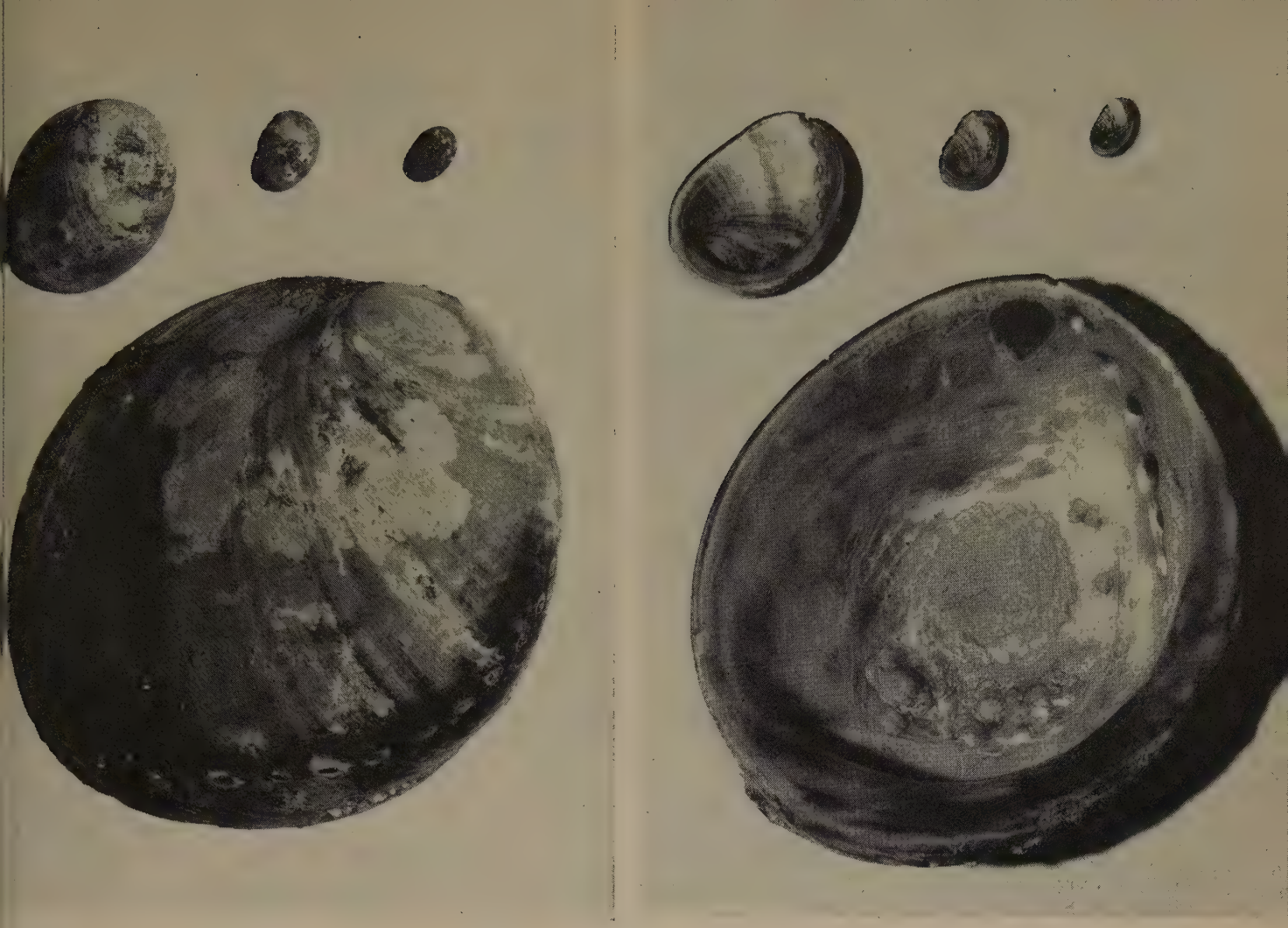
George Crabbe, whom Byron called "nature's sternest painter yet the best" was sick and tired of pretty poems about pleasant scenes. He particularly disliked the artificiality of pastoral poems with their picturesque and idyllic swains and shepherdesses—Damons and Phyllises and Corydons singing love songs. He intensely distrusted Goldsmith's sincere but nevertheless sentimental and homesick reverie called *The Deserted Village*, with its spontaneous affection for simple country folk and country life. So Crabbe wrote *The Village* in which he rolls up his literary sleeves and goes to work to show the misery, depravity, and degradation of certain English country folk. He has none of Burns' humor nor Wordsworth's compassion. His natural scene is so ugly, so blighted and unproductive that farmers have turned smugglers, and the happiest village folk are the moping idiot and the gay madman. Says he,

Cast by Fortune on a frowning coast,
Which neither groves nor happy valleys boast,
Where other cares than those the Muse relates,
And other shepherds dwell with other mates,
By such examples taught, I paint the cot,
As Truth will paint it, and Bards will not.

Matthew Arnold also protested. Arnold felt the charm of scenery, and wrote dozens of superb descriptive passages. He saw man's feverishness against the wholesomeness of Nature. Indeed, in *Resignation*, he wrote that Nature seemed merely to tolerate man. Yet Arnold never identified man *with* Nature. He saw, rather, a cleavage. Once when he heard a preacher exhort men to be in harmony with Nature, to be like Nature strong and cool, he cried out,

Restless fool . . .
Know, man hath all which Nature hath, but more
And in that *more* lies all his hopes of good.
Nature is cruel, man is sick of blood;
Nature is stubborn, man would fain adore;
Nature is fickle, man hath need of rest;
Nature forgives no debt, and fears no grave;
Man would be mild and with safe conscience blest.
Man must begin, know this, where Nature ends,
Nature and man can never be fast friends.
Fool, if thou canst not pass her, rest her slave!

This is not so much hostility as it is (reversing Byron's famous lines) not loving Nature less but man the more.



Exterior and interior views of the black abalone, *Haliotis cracherodii*. It is the most common of the six large species found on our Pacific coast. It has the smoothest exterior of any of these, and reaches a size of six inches. The iridescent interior is pearl gray and pink, and the exterior, when polished, reveals a beautiful silvery background with red and green reflections. The larger shells are about two-thirds natural size, and there are shown smaller specimens of varying size.

In warmer coastal waters in many parts of the world are found—

The Valuable Abalones

By GRACE SHULTS DAVIS

THOSE persons who are fortunate to live in coastal regions and who frequent the tidal waters will recall that December, January and February bring the scattered dates when extreme low tides alternate with extreme high ones. Time was when one was ready to follow the low tide out to its farthest, and to explore rocky crevices still moist with sea spray, and abandoned tide pools alive with fascinating bits of life and color. But for most of us, days at the seashore, rides in glass-bottom boats and submarine excursions in search of specimens and beauty must be forgone "for the duration."

However, we may dream of such pleasures, even as we dream and work for victory, for the cessation of hostilities and for return to normal life and living. Dreaming can be very real, too. It is not difficult to relive those pleasant days spent in clambering over and searching among the rocks and kelpy crevices where foamy fingers of the ocean play.

We wonder how the submarine gardens and fascinating bits of life and beauty are getting along without our curious gaze upon them. Very well indeed, we may be sure, for of all of Nature's phases, sea life is most independent of man and man's doings. The solid terrain will bear many scars of the present terrific conflict, but the sea and its creatures will come out of

it practically unscathed. Unmindful of the strange and deadly craft plying in their three - dimensional domain, the myriads of Mollusca, Coelenterata, Sponges, Fishes, Arthropoda and Protozoa continue their peaceful existence in an insulating medium, caring not that the greatest war is on. The one in a million chance of a direct hit is too insignificant to worry about. And when the depleted ranks of terra firma's creatures resume their normal days and ways, it probably will be to find that many creatures of the sea have multiplied during the days of war siege.

Then it will be that man can go again to the seven seas to partake of the riches they contain—food staples and delicacies, chemicals, medicines, and other products too numerous to mention. Then it will be that we can pry around once more in the frilly edge of those great waters, to study the ways and enjoy the beauty of the living forms found there, to marvel at the brilliant, cheerful coloring, equally pronounced in a tide-pool of tea-cup capacity or in thirty fathoms of ocean.

Exterior of the largest North American abalone, *Haliotis rufescens*, the red abalone, which reaches a length of nine inches. It has a lumpy surface with three to four ridged open perforations. The polished exterior is beautiful coral red on a silver background and is used for inlay work and articles of mother of pearl.

Among the now depleted forms of marine life that we hope may recover its former state of abundance is the abalone. Perhaps we will be able again to find it as it was several years ago when one could take the limit and leave many more undisturbed.

So common was the abalone in many places a few years ago, that the real beauty of the shells was largely unappreciated. I have seen walks and yards bordered with these shells in place of rocks, and elsewhere great heaps of them left to weather.

But the commercial wolf came—the same wolf that thinned out the Alaskan seals, and even attacked such spiny prey as the barrel cactus of the Mohave Desert. A good food, and ranking with other branches of fishery, several million pounds of abalone were taken from California shores each year until the beds were damaged and depleted. Most of the abalone meat was taken by greedy, unscrupulous Japanese, and was dried and shipped to Japan.

Rather late, protective laws were passed by the State of California, and the coast counties, to govern abalone fishing. Regulations as to size, quantity, method of taking, and open and closed seasons were established. There are two sets of laws now, one controlling commercial fishing, and one governing the sportsman. Drying of the meat is prohibited, as is shipping it out of the state in any form. Even exportation of the shell is forbidden, except in the manufactured article.

These protective measures were passed so late, however, that the habitats were already sadly ravaged. Just before the war, we visited Abalone Point by Corona Del Mar in Orange County, California, where formerly abalones had been so thick that we could bag the limit without moving from one spot, yet leave thirty more within reach. We found one tiny specimen two inches across! I touched it without any intention of taking it, and it clamped down resolutely upon its rocky foothold as if determined to preserve to the best of its endurance its own meager ego of existence.

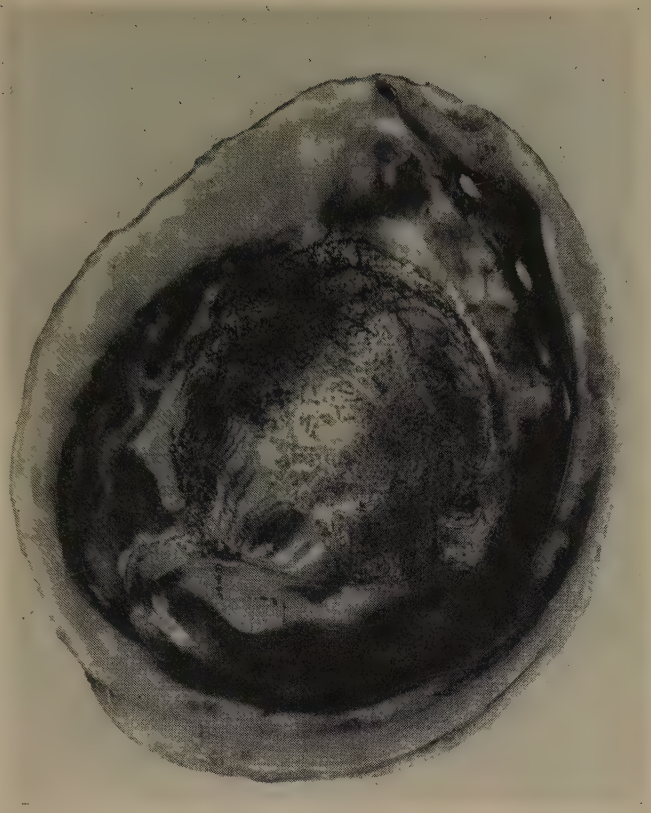
The Abalone family—called Haliotidae—is one of the oldest forms of Mollusca, appearing as early as the Cretaceous Period. Several species almost identical with living species today have been found in the Late Tertiary. Two or three million years is a short time geologically, yet it seems a long time for a living form to maintain its identity through such a long series of generations.

In more recent history, the American Indian found extensive use for the abalone. The great deposits of shells occurring in Indian kitchen middens along the entire Pacific Coast of North America, indicates its great use as a food. Numerous articles, from kitchen utensils to personal ornaments, were fashioned from the shells.

The distribution of the abalone being wide-spread, the large gastropod is commonly known in many lands. Although abalone is the common name applied in the United States, it infrequently is called aurora shell and rainbow shell. In England it is known as ear shell, sea ear, or ormer. The French called it *silieux*, and the Pacific Coast Indian named it *uhlo*. The Japanese term, if set down in our characters, is *awabi*.

Several species of abalone are found in the coastal waters of Africa, Australia, New Zealand, New Caledonia, the Solomons, and other now famous islands of the South seas. They also occur off the British Isles, Japan, and the western coast of North America, from the Bering Straits to Mexico.

The larger species are found on the Asiatic and American coasts of the Pacific, north of the equator. The species found off Australia and the South Sea Islands, south of the equator, are small and of little commercial value, although Australia has the largest number of different species. Those occurring on the islands of the English Channel, while not as large as those found on the Pacific coasts, do have local value and are seen to a small extent in the English markets. Of these, *Haliotis tuberculata* occurs commonly and abundantly from the Channel Islands southward along the coast of Europe and as far as the Canary Islands.



The interior of the red abalone. This is a scrambled rainbow with a mixture of glowing and dancing colors in which blues and greens predominate.

The abalone has not been found on the eastern coast of America, which is washed by the cold Labrador current. This mollusk prefers a warm home. A few scattered individuals have been taken off the West Indian islands, but it is quite probable that they drifted there from other regions.

As a child I used to wish that the outsides of abalone shells were as beautiful as the insides. What I did not know, then, was that the outside was even more beautiful, although hidden under a dull crust that can be removed by a process of polishing. Beautiful articles and lovely mother of pearl inlay work are fashioned from polished abalone shell, and various species exhibit characteristic colorings and markings.

There are abalone pearls, greenish, large in size, and with a beautiful lustre. Like oyster pearls, they are produced as a covering over some foreign particle that has found its way into the shell, or for reenforcement at a point where the shell was punctured by a boring clam or other foreign agent.

Experiments have been carried out successfully to prove that the formation of pearls may be induced artificially by fastening little forms to the shell under the mantle—the mantle being the edge of the abalone's soft body. Being a univalve, the shell of the abalone does not have to be opened as in the case of the oyster. The secretion from the mantle covers the foreign substance with a layer of nacre similar to the mother of pearl that lines the shell, forming a pearl in from seventy-five to one hundred days. The longer the time allowed in the artificial propagation, the bigger and better the pearl will be. You cannot rush an abalone.

★

Warbler in the Mossed Oak

By DANIEL SMYTHE

A black and white moves on the bark
Of the oak tree; it is too dark

Within this dawn, half-mist, half-rain
To see its every movement plain.

Out on the water, white gulls skim
And fade in mist that makes all dim.

But here a tiny warbler comes,
Not like the sparrow seeking crumbs.

I walk beneath him as he springs
From branch to branch on limber wings.

He draws me into stealing time
To follow where his small feet climb.

And he appears like some quick thought
Which the tree's head seems to have caught.

The Palm that Sweats Wax

By RICHARD W. WESTWOOD

FEWER phonograph records; scarcer polish for your floors or your ageing car; rationed sound film for Hollywood; other products missing or hard to find—all these trace back to sun-seared northeastern Brazil; to a palm tree; to the grim business of fighting a war.

From July to December the sun burns down on the eastern Brazilian States from the Amazon south to Bahia. Relentlessly it turns the vegetation a discouraged gray. But there remains one certain touch of courageous green—the carnauba palm. Defying the burning rays, this slender graceful tree, twenty-five to forty feet tall, flaunts wide fan-shaped leaves at the ends of three-foot stalks. It takes dry weather in its stride, exuding wax from its leaf pores, coating the green fingers of its fans with a protection against evaporation. The drier the season, the thicker the wax.

Carnauba wax is no new product, and no other wax is imported in such quantities to meet the active commercial demand. Three times as viscous as beeswax, and otherwise exceptional, its uses in industry are as varied as they are numerous. From carbon

An uncut carnauba palm in full foliage. This tree is between twenty-five and thirty years old. The position of the leaves shows which ones are heaviest with wax and ready for the harvest. At the right, the freshly-cut leaflets of the palm are gathered and loaded on a burro to be taken to the drying field. Photographs from S. C. Johnson and Son.

paper to waterproofing, from cable coverings to soap, it serves, and, today, has many roles in war industry, some of which are guarded military secrets.

Brazil has this valuable palm all to itself. Transplanted, it has flourished in French Africa and Ceylon, but rain and humidity there make its waxy "sweat" unnecessary. So it just relaxes, grows and looks pretty. Brazil, also, has to itself the only other wax-producing palm—the licuri palm—that offers any competition to the carnauba, although it has not yet produced wax of consistent quality.

Botanists call this palm *Copernicia cerifera*. It has a close relative, *C. caranda*, that produces no wax at all. The popular name of carnauba comes from the word that the native Tupi Indians have for the palm—"carnahyba." This in turn, is made up of "caranda," which means scaly and thick-skinned, and "yba," the word for tree or palm. The result is a descriptive word typical of many local names.

Flowers of the palm are numerous but small, and it produces little oval-shaped fruits about an inch long. They grow in clusters and are greenish when young, turning to a rust color when ripe and ready to drop. While the wax is the most important product of the carnauba palm, the tree has many local uses that provide an example in complete utilization. Its lumber is used for construction and makes fine and durable furniture. Hard, it resists both salt water and insects, so serves as pilings and for bridges and fences. The bark is used for home fires, and the wood burns with such an intense heat that it is excellent for industrial fuel. The leaves make thatch roofs, clothes, hats, mats and sacks, or may be carded into mattress stuffings. The best leaves yield material for high-grade hats, supporting an important local industry in Ceara. Nets and fine ropes are made by spinning the long fibers, which are silky and resistant.

A tapioca and a fermented beverage come from the sap of the carnauba palm. Young shoots are eaten. A starch may be made from the hearts of the young plants. Dried, the fruits are crushed for a cooking oil; roasted and ground, a drink like coffee may be brewed from them. The roots yield a drink not unlike sarsaparilla and regarded as medicinally valuable. Residue serves as cattle fodder. All of the carnauba is used but the shade, its least valuable asset.

"Millions" is the loose estimate of the number of producing trees in the nine Brazilian states where this palm is found. About 26,000,000 pounds

The bark on the carnauba palm, especially on the lower part of the trunk, is scaly, rough and thick. The trees grow sparsely, dotted over the carnauba country. At the left, workers carefully lay the leaflets on the drying field, from which they are gingerly taken to the sheds where the wax is extracted from them. Photographs from Ruiz Corrieia and S. C. Johnson and Son.

of carnauba wax were produced in 1941, and, based upon the usual production per tree, this suggests some eighty million palms working to keep Uncle Sam's war machine well waxed, and Fibber and Molly on the air. In recent years many selected trees from experiment stations have been set out in convenient places. These will add to the quality and amount of the output, when the trees yield wax at seven years and reach full production at ten.

Nature is responsible for most of the producing palms today. But those that have been planted on a systematic basis provide little or no problem of clearing, cultivation or labor expense. After the first year the young trees are on their own and amazingly self-sufficient.

Harvest-time on the carnauba "plantations" is from August or September until the winter rains come. If these are late the harvest may continue into February. Over the countryside roam cattle raisers who live a semi-nomadic life as they seek out pasturage for their herds. These *moradores* work much as did the roaming fruit pickers of our West in pre-war days. They harvest cotton, carnauba and other crops in season, their cattle meanwhile fattening on the local pastures. These wandering ranchers either rent palm land, harvest and melt the wax and sell it back to the proprietor, hire themselves out for the harvest period, or enter into cooperative arrangements.

Bagged wax from the carnauba palm. There are several grades of wax that serve to meet the varied demands of commerce for the valuable product of Brazil's palm.

Armed with a sickle-like knife on a long handle, the harvesters cut out leaves that have not quite reached maturity. Young leaves indiscriminately cut would doom the tree; old leaves possess little wax. The position of the leaves is the clue to their age. Starting upright, the leaves gradually bend over from their weight as they mature. When they hang straight down, "at six o'clock," they are past their prime.

Two or three, and sometimes more, cuttings may be made during a season, depending on how long it remains dry. Three cuttings are believed best for year-to-year yield. Study has proved that these should be sixty days apart. From eight to a dozen leaves are cut each time from a tree. Varying with the size of the leaf, the geographical location and the time of the harvest, between 2000 and 3800 leaves will yield thirty-three pounds of wax, or one Brazilian *arroba*.

The cut-out leaves are carefully gathered and taken to a central terrace for drying. This is usually a sunken place with a three-foot wall around it. Thus the sun can burn down on the drying leaves, and the wall keeps the wax dust, which forms in the three to five days of drying, from blowing away. Finally these dust-covered leaves are gingerly carried to a small windproof shed.

There, preferably at night, since the dust settles better then, the extraction operations take place. The leaves are drawn over upright toothed blades that split the ribs and open up the webs. The leaf is ripped apart to loosen the wax, and two to four of them are beaten across a piece of timber. The dust settles on floor and walls and is carefully swept up. This shed is no place for sufferers from asthma or sinus trouble.

Such rather primitive methods of extraction have long obtained in the carnauba country. They are not very efficient and there has been much waste. Invention and research promise to increase production, however, through the use of machinery developed for the purpose. A Brazilian has developed a simple beating machine that increases the extraction of wax by one-third, and American industry has lent its genius to provide other improvements. The individual farmer or plantation owner, to whom the production of the wax is only a side issue, must otherwise have been satisfied with the old-time methods.

Once the powder has been obtained it must be melted and strained to get out the bits of leaf and fiber still in it. This is being increasingly done at plants on the coast, the powder being shipped there.

Various grades of wax are derived, but there are two major classes based on the kind of leaf. Seventy percent of the wax is known as "palha," or straw wax, and comes from the larger leaf. The other class is "olho," or eye wax, and comes from a smaller yellow leaf that grows from one of the palm "eyes."

The olho powder is melted without the addition of water and produces the finest grades of wax, yellow in color. The palha grade, when it is melted without water, produces wax that ranges in color from dark yellow to virtually black; mixed with water its color range is from a gray to dark green. All are poured into receptacles to harden after melting, and cakes of all carnauba wax are hard and brittle.

Thus has Nature stored up in a palm tree a valuable natural resource that man has turned to many purposes that have become important to his way of life. To the versatile company of the soybean, the peanut and others we may add the carnauba palm.

Shallot, unicorn plant, cummin, scorzenera, skirret and witloof are vegetables that put—

Variety in the Victory Garden

By MARY P. DAVIS

IF ANY amateur gardeners last year discovered that there was a bit of monotony in their victory garden work, adaptation of an old saying suggests a remedy. Variety in the kinds of vegetables planted may bring spice to your labors. Try something unusual.

You probably raised our old friend the onion, *Allium cepa* to the botanist, in last year's garden. How about leaving a little space for *Allium ascalonicum,* which is connected with a most interesting era in medieval history? Pliny the elder saw the shallot in Ascalon, Syria, perhaps while he was procurator in that country. He mentioned the plant in his historical notes of his travels. Centuries later, in telling of the impetus given to commerce between Europe and the East by the Crusades, Michaud, the French historian, tells us that "our gardens owe to the Holy Wars shallots, which take their name from Ascalon." Some of the Crusaders carried the new plant home with them to continental Europe and England, where it was accepted with interest, and was cultivated. It may be that some of our men in the service may bring a vegetable trophy home with them when they return from their "crusades" in the Mediterranean countries and the Pacific islands.

It is possible to find the bulbs of the shallot listed in some of our seed catalogs, and the directions for raising the plant seem not too hard to follow. The main bulb separates into smaller ones after the summer is over. These small bulbs, or "cloves" can be kept for planting in the spring. They are used like garlic for seasoning, but give a much milder flavor. The young leaves also serve as seasoning. With these varied food uses and the glamour of the Crusades about it, the shallot should be a very acceptable addition to your garden.

New Zealand spinach, *Tetragonia expansa,* also has a story attached to it. It is said to have been discovered by Sir Joseph Banks in New Zealand while he was taking part in Captain Cook's expedition around the world. Sir Joseph accompanied the party as a botanist.

After landing at Brazil and Tahiti and exploring New Zealand, the Captain sailed for Australia, or New Holland, as it was then called. Sir Joseph wrote in his journal of leaving "Botany Bay," which had been their first landing place on reaching Australia: "Went to sea this morning with a fair breeze of wind. We dined today upon a sting-ray weighing 336 lbs. and his tripe. We had with it a dish of the boiled leaves of *Tetragonia cornuta,* which eat as well, or nearly as well, as spinach."

The name *cornuta* is not used now, so the dish was evidently of *Tetragonia expansa,* or New Zealand spinach. The plant was grown at Kew Gardens soon after the exploring party returned to England. Later, seeds were sent to members of the New York Horticultural Society, and New Zealand spinach became known to America. It is not a true spinach, but answers the same purpose and can be had during the summer, when

Celtuce is a vegetable newly-naturalized in this country, but one with an ancient history of usage in China, whence it was brought to the United States. Burpee photograph.

spinach is not ready for eating. It has the added advantage of being a "cut-and-come-again" vegetable.

The *Martynia proboscidea,* or unicorn plant, has two attractions for the gardener. The flowers are large and gorgeous in coloring; the pods, if picked when young and tender, may be made into pickles. These pods are variously called the "proboscis," horns, or "devil's claws." In the North, the plant must be started in a hot-bed until the weather is warm enough to transplant it to the open. But do not let that prevent you from raising it. Think what a hit you could make with a luncheon if you served pickled devils'. claws and unicorns' horns!

Some of our service men and correspondents in England noticed that many of the gardens there have flowers mingled with the vegetables to add beauty to usefulness. You may do the same and yet have an appetizing relish if you plant nasturtiums with the potatoes and onions. Their seeds and pods make a pickle, the pickled seeds being somewhat like capers. The leaves have been used like cress in salads in England, where the plant is called "Indian cress." Both leaves and flowers are attractive for garnishing. In fact, so useful did the nasturtium become that as far back as 1683, Worlidge, an English writer, said, "from a Flower are now become an acceptable Sallad, as well as the blossom." In 1690 they were grown in the royal kitchen gardens of France.

New Zealand spinach has an interesting history, having been discovered by Sir Joseph Banks, botanist on the voyage of Captain Cook. Burpee photograph.

The oxalis is generally used as an ornamental border, but will form part of a salad as well. The leaves have an acid taste, as we might expect from its name, which comes from a Greek word meaning sharp. The roots of some species in South America are eaten. Both the dainty oxalis and the gay nasturtium will enliven your garden, your salad, and your palate.

Beginners in gardening have probably not experimented with celery, as the blanching process is too complicated for inexperienced workers or limited space and equipment. The celery flavor can be found in celeriac, or turnip-rooted celery, without the work of hilling and blanching. Celeriac may be boiled, or used as seasoning for soups and stews. The roots, stored in moist earth or sand, may be used through the winter. The plant is a favorite in Europe, and in parts of our country where there are settlements of foreigners. When it is boiled and sliced and eaten with oil and vinegar, it is called "celery salad."

Celtuce is another celery-flavored vegetable. It came to us from China, but is rapidly becoming "naturalized." When the plants are young, the leaves may be used as lettuce, or boiled as greens. Remove the outer skin from the stalk, and it may be eaten raw, as celery, or cooked and served with a sauce. Apicius, noted cook and epicure in the early days of the Christian era, would have made a masterpiece of it! One of our seed catalogs waxes eloquent about the taste and vitamin content of celtuce and insists that we "be sure to give it a trial."

Chinese or celery cabbage, sometimes called Portuguese cabbage, is a salad vegetable that is usually planted in July. The veins and leaf stems are enlarged and extend down the stalk. The white, tender, inner leaves have the celery flavor, and may be eaten like celery. The plant also makes excellent cole slaw. The vegetable is mentioned in Chinese works of the fifth century and is still used in Asia, especially on the Pacific coast. Our different varieties have Chinese names — Chihli, Pe-Tsai, Wong Bok.

The spoonleaved corn salad is grown in our country, most extensively in the South. It is planted in the southern states from June to September, and from October to January. The leaves are used in the same way as lettuce or cress. Gerarde's quaint old Herball of 1597 calls the plant Lambs Lettuce or Corne Sallad, and tells us: "In winter and in the first months of Spring it serves for a sallad herbe and is with pleasure eaten with vinegar, salt and oile, as other sallads be; among which it is none of the worst. . . ." If you have a sunny, sheltered spot in your garden to spare, even if you are several degrees north of the southern states, you can raise this plant that "is with pleasure eaten."

If you would like a new kind of bean, try lentils, which were among the supplies given to King David and his loyal followers when he fled before Absalom and his conspirators and took refuge in the city of Mahanaim. There was evidently no food shortage there. "Wheat and barley and parched corn and beans and lentils and parched pulse and honey and butter and sheep and cheese of kine" were given to the fugitive king and his friends! But do not rush off to buy a ticket to Mahanaim, for that hospitable city seems to have vanished from the map.

Lentils, or the Biblical (Continued on page 162)

The Clowning Coons of Ash Mountain

By GAYLE PICKWELL

On the edge of Sequoia National Park, Ash Mountain is a Utopian wild without dogs, cats or guns. Nightfall brings to the area around Park headquarters a multiple-ringed circus of wild performers, who come to sample the larders of garbage cans, or to eat meals specially-proffered by someone who has come to record events on camera film.

Soon after the mid-December sun had sunk into the San Joaquin Valley, gray foxes glided from their daytime hideouts in search of food. Soon three raccoons followed, emerging as a group from beneath a cabin. In fact, unlike the skunks, foxes and ring-tailed cats, the 'coons foraged in groups, sometimes a family of three, often several families making an avalanche of a dozen hungry animals. Small growls, coughings and almost voiceless snarls punctuated their feeding. Over the feeding area they advanced deliberately and with determination, foxes giving way before them and remaining watchfully in the background.

As special inducement to pose for the camera, we offered sweetened bread. This the raccoons took with paired hands as dexterous as the human hands that served them. Some would squat like a dog, or hold the food to the face in a crouched position, or stand bolt upright with hands held out imploringly as they begged for the bread. They never seemed satisfied, yet after a few minutes of growling would leave abruptly to be gone for an hour or more, returning as suddenly as they had left to sweep the foxes before them again.

Now and then a striped skunk would appear to compete for the handout. At such times there were mo-

ments of comedy—and suspense. Tail arched threateningly, the skunk might pat the ground in vigorous warning. Yet the raccoons seemed to recognize no danger and ignored the skunks and their potential weapons of attack.

Although sweetened bread was the chief lure, other foods were offered. A pan of stew showed the dexterity of the 'coons as they reached in for bits to stuff into their masked faces. They would poise on the rim of a pail of water, into which bread had been thrown, to fish it out with their handlike paws. Mother seemed to run the family and was first on hand for food, fearless of humans.

Most personable of the animals of the night, raccoons, alive and unafraid at their feeding, remove all desire of the observer to own a coonskin coat.

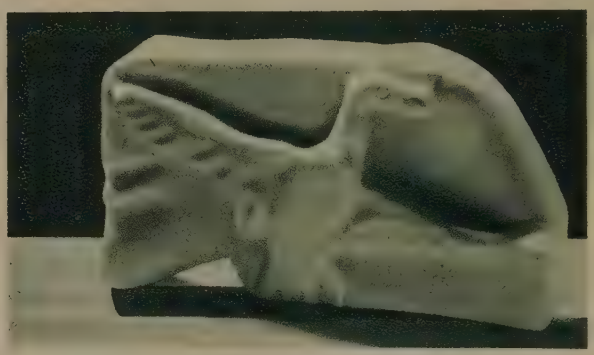
Raccoons are perhaps the most distinctive of our American wild mammals since they are found only in North and Central America. They are most widely distributed through the southern states and the milder regions of the West Coast, although they range through the northern states and into Canada. Raccoons make us think of such American pioneers as Davy Crockett and Daniel Boone, with their coon-skin caps.

Perhaps it is the facial masks that make the raccoons seem to be clowns, these and their amusing antics while feeding. However, they are not clowns in fact but beautiful and interesting animals. The families at Ash Mountain were still together in December, and the mother 'coon was still a stern manager. Sometimes a human would disturb the younger animals, who would take to a nearby oak. At times a raccoon in a tree would give a surprising churring or thrilling note, a sound not unlike that of an American toad.

"A Fawn"—By Regina Connel, Braddock, Pennsylvania.

"Ferdinand"—By Mathew Gelfand, West Hartford, Connecticut, winner of second prize in the Junior Class for entrants under fifteen years. All of the sculptures on this page are in this class.

"Frisky"—By Betty Ewald, Beatrice, Nebraska.



"White Beauty"—By Vernando Bonsignore, Elmira, New York. Left, "Bambi"—By Gerald Eden of Beatrice, Nebraska. This sculpture won a special prize for the best piece suited for pottery. Right "Defender"—By Lawrence Marquardt, Kansas City, Missouri. Below, "Butch"—By Rodney Epp, Beatrice, Nebraska.

Nature provided the inspiration for many of the hundreds of sculpturings entered in the nineteenth annual competition for small sculptures in Ivory soap sponsored by Procter and Gamble. Ten of the prize-winning entries are published on this page as examples of the work.

The twentieth annual competition is now going on and will terminate during May.

It is not too late to enter, by any means, and full details of the competition may be obtained from the National Soap Sculpture Committee, 80 East Eleventh Street, New York. We hope that some of the younger readers of Nature Magazine will find an idea in one or more of the thousands of Nature pictures they have seen in this magazine and submit a prize-winning carving.

"A Horse"—By Margaret Ann Munt, LeRoy, New York, a delightful piece and rather a favorite of ours.

"A Bear"—By Roy Elmer Wyatt, Canon City, Colorado. Lower center. "Chew"—By Sydnor Almy, Englewood, N. J.

A side view of the beautiful luna moth a few hours after it has emerged from the cocoon. The larvae of this moth are often found feeding on birch leaves, and the cocoon in the oval above was found lying at the foot of a birch tree. The luna's cocoon is the darkest in color of any of the four great American silkworm moths. It is often made on the ground by its occupant, and leaves form a part of its outer coating.

Sleeping Beauties Of The Winter Woods

By EDWIN WAY TEALE

Shaken by the gusts, covered with sleet and snow, often hurled to the ground in the midst of storms, those sleeping beauties of the moth world, the cradles of the great American silk-worms—the cecropia, the luna, the polyphemus and the promethea—endure through the months of cold. You find these silken shelters dangling from twigs, or lying among fallen leaves in the winter woods. By bringing them home and storing them in a sheltered place outdoors, or on damp sphagnam moss indoors, you can enjoy the rare beauty of an insect pageant of color when spring arrives. The emerging moths, with their delicate, pastel shades of red and brown, blue and pale green, are among the most beautiful objects in Nature.

The pictures on these pages reveal the form and markings of the adult moths, as well as the appearance of the cocoon from which each emerges. All of these cocoons contain silk that is both stronger and more lustrous than that produced by commercial silk-worms. The compact, two-inch, oval cocoon of the polyphemus, for example, contains as much as a

An adult cecropia moth and the cocoon from which it has emerged. The picture was taken one hour and one-half after the moth had appeared; the insect is completely dry, and the wings have hardened.

half-mile of silk in a single unbroken thread.

A number of attempts have been made to produce such silk commercially. At one time, an experimenter near Boston, Massachusetts, fed nearly one million larvae of the polyphemus moth on the foliage of a wooded tract that had been enclosed in a vast netting-tent to keep the birds away. The high cost of labor and the difficulties encountered in processing the silk, however, have made its commercial production impractical.

The most easily found of the giant silk-worm cocoons is that of *Samia cecropia*. The caterpillar of this moth always attaches its silken shelter lengthwise along a twig. It has the appearance, oftentimes, of a closed hammock, and, for this reason, has been called "the cradle cocoon." Because it is so solidly attached to the twig, the cecropia cocoon often falls victim to woodpeckers in midwinter. Dangling cocoons, like those of the promethea, swing like a punching bag when struck by the bill of a woodpecker. This makes it more difficult for the birds to drive their chisel-bills through the outer layers and reach the pupa within.

Like most of these cocoons, the one produced by the cecropia larva has a papery outer covering, then a layer of loosely-woven silk, and, finally, an inner shell, tough and smooth, which forms the chamber that holds the pupa. In making its cocoon, the cecropia caterpillar weaves the silk lengthwise instead of crosswise when it produces the upper end. This provides an escape valve that makes exit easier when the moth crawls from the cocoon as an emerging adult.

All three of the other moths, *Telea polyphemus*, *Callosamia promethea*, and *Actias luna*, come from cocoons that have leaves attached to the outside. The luna caterpillar often makes its cocoon between fallen leaves on the ground, and, in the eastern part of the United States, the polyphemus cocoon almost invariably falls to the ground during winter storms. I have never found either of these cocoons anywhere except among fallen leaves. The promethea, however, remains invariably attached to the twig where it was formed, hanging like a dead leaf. It is secured by a sleeve of silk that runs up the stem of the leaf within which the cocoon has been made, and encircles the twig from which the leaf grew.

In making such a cocoon—usually on a wild-cherry tree—the larva covers the upper side of a leaf with silk after it has reenforced the stem. Then it produces the cocoon within, pulling the edges of the leaf like a cloak around the cocoon so it is almost perfectly

camouflaged. I once found more than a dozen of these cocoons dancing in the wind of a boisterous March day, forming a little cluster of what appeared to be dead leaves still clinging to the otherwise bare branches of a wild-cherry tree.

If you collect cocoons in March, you still will have two months leeway before the colorful parade of giant moths begins its performance. Usually it is late May or early June before the insects emerge. By ejecting fluid from their mouths, some of the moths soften the end of the cocoon so they are able, with clawing feet and pushing body, to work their way to freedom.

One insect photographer, some years ago, took advantage of this fact and placed small metal plates at the upper ends of his collected cocoons. When the silk of a cocoon became damp, an electric circuit began ringing a bell. This notified the photographer that a moth was about to emerge. This strategem saved him long hours of watching and enabled him to catch the insects at the moment they pushed their way to freedom from the interior of their silken shelters.

The first intimation that a moth is about to emerge—if you depend upon your own eyes and ears—are faint scratching noises within the cocoon, the dampening of one end, and then the movement of the dampened silk as the insect pushes and works in its effort to escape. Some of the older entomological works asserted that a moth must strengthen itself by such a struggle in order to develop properly. This, however, is not necessarily so. I once opened a damaged cecropia cocoon and found the pupa uninjured within. This pupa lay like an oyster on a half-shell for a dozen weeks before its emerging-time arrived. Yet it appeared perfectly formed and normal in every way when it made its exit simply by breaking the thin pupal shell.

Soon after the first of your collected cocoons produces its adult moth, the others will follow suit. During the weeks of late May and early June, a score or so of cocoons will provide surprises and excitement. Part of the surprises come in the form of curious winged parasites that sometimes appear from the cocoons in place of the expected moths. The excitement arises mainly from the surpassing beauty of the moths. These gorgeous creatures are entirely harmless. They never eat anything and they live but a few

A promethea moth, its wings dry and hardened, prepares to take to the air on its first flight. All these giant American silkworm moths are nocturnal. Below are camouflaged cocoons of promethea. Note how the sleeve of silk has been extended up the stem of the leaf to secure the cocoon to the twig. Even the strongest winter gales usually fail to dislodge the cocoons of the promethea from their supports.

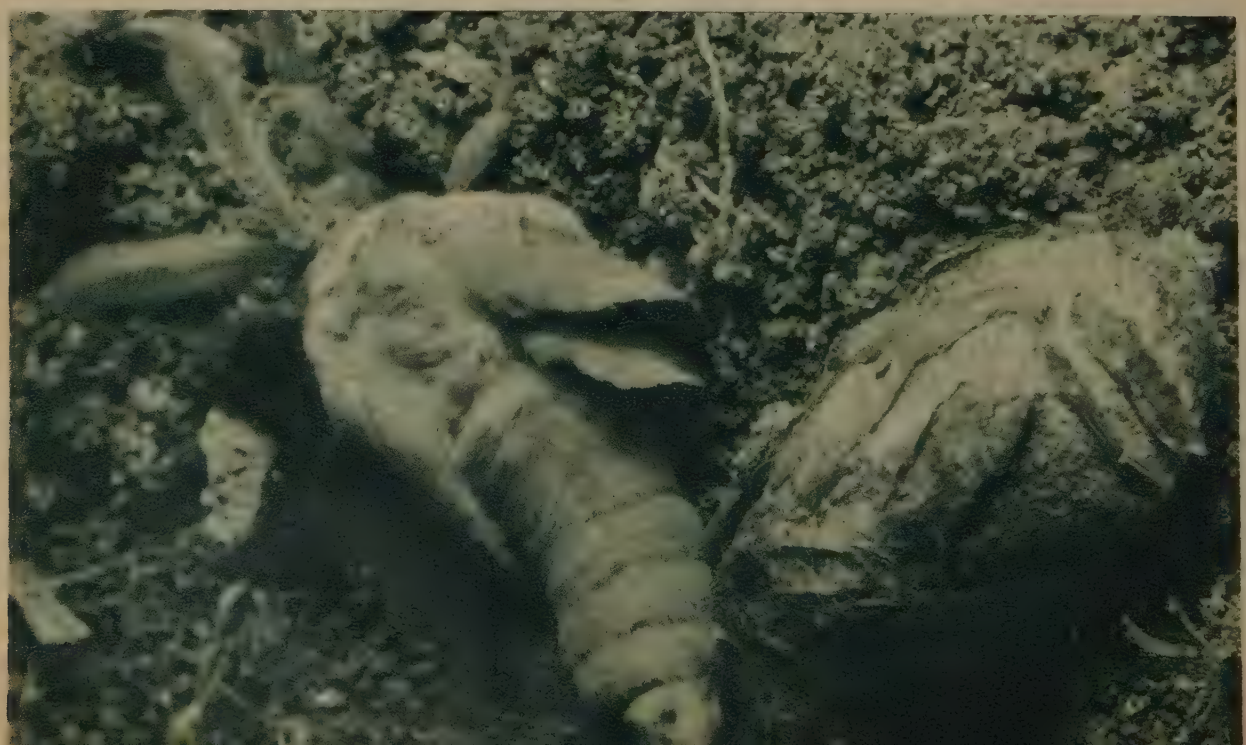
Adult polyphemus moth on a curiously-twisted sassafras branch. The striking eyespots on the hind wings are transparent. Below is the cocoon of the moth with a damp and bedraggled occupant that has just emerged. Like the other moths, it must climb some support to unfold its wings and let them harden before it can fly.

days — mating, laying their eggs, and dying to complete the swift cycle of their lives.

The luna is one of the most graceful and delicately beautiful members of the insect host. Its long, ribbon-like tails are unique among our moths. Its body seems clad in ermine, while its pale-green wings, with their transparent, ringed eyespots, have a spread of as much as four and a half inches. The polyphemus and the cecropia moths have an even greater wingspread — sometimes as great as six inches.

Watching these exquisitely colored wings gradually unfold, as the newly emerged moth hangs motionless, is one of the main rewards of winter cocoon collecting. Out of a harvest of such cocoons appear the delicate greens of the luna, the blues and tans and pinkish tints of the polyphemus, the reddish browns of the promethea, and the rich red tints of the cecropia.

In this rainbow of insect colors the story of the giant American silk-worms, and the gorgeous creatures they become, reaches its natural climax. The silent, winter-long imprisonment of the sleeping beauties is at an end.



Conservationists Confer

On January 18, 19 and 20 an informal meeting was held in Washington to ascertain, if possible, the post-war plans of the many Federal agencies concerned with our natural resources of land, water, forests and wildlife, and the impact of these plans on the conservation and use of these resources in general.

The call for the meeting was sent out by the National Audubon Society, the Izaak Walton League of America, the National Wildlife Federation and the American Wildlife Institute. Twenty-nine national, non-governmental organizations were invited to attend, all of these groups being interested broadly in conservation or in some special field.

Thirteen Federal agencies were invited to present the story of their problems and plans. These were the Fish and Wildlife Service, the National Park Service, the Office of Indian Affairs, the Grazing Service, the Forest Service, the Soil Conservation Service, the Reclamation Service, the Geological Survey, the General Land Office, the U. S. Public Health Service, the Public Roads Administration, the Federal Power Commission and the Army Engineers.

Three of these agencies failed to send representatives—the Geological Survey, the Public Roads Administration and the Federal Power Commission. The Army Engineers, by reason of wartime restrictions, confined their discussion to general terms and omitted discussion of plans.

Opinions as to the results of the conference will inevitably vary. Insofar as its primary object of discovering post-war plans was concerned, the meeting was far from fruitful. In our estimation, however, the sessions were of unquestioned value because of the weaknesses revealed—weaknesses that should aid in charting the course for the future.

Most of the heads of agencies reported current problems due to shortages of personnel and reduction of appropriations. These conditions may be assumed to be largely temporary and inevitable in time of war, because in many instances projects have been dropped that should have been carried forward. On the whole, however, the demands of war do not appear yet to have caused an irreparable drain upon any of our renewable natural resources. While government may be marking time on many of the integral parts of the conservation work of various agencies, it does not seem to have lost important ground.

As to the future, however, such information as was vouchsafed the meeting was neither encouraging nor illuminating. There seemed to be little specific post-war planning. Possibly more has been done in this direction than was revealed, because of reasons of policy and relations with the legislative branch of the government. Nevertheless, we got the impression that too much of the thinking was in the direction of putting men to work after the war, rather than what they would do, and how valuable, in the conservation sense, the results of their labors might be.

In our opinion, however, the most glaring weakness revealed by this meeting was the lack of coordinated thinking and planning as between the several agencies. Some two or three may work fairly closely together where their interests are closely allied, but this is certainly not the rule. This, we gather, is chargeable to several factors, including the laws that created some of the agencies and prescribed the scope of their activities, and the jealousies of bureau and personal prerogatives that seem inherent in the bureaucratic system.

This lack of coordination in thinking and planning is most evident with respect to water resources, that conservation orphan that gets knocked around like a puck in a hockey game. One agency thinks of water only in terms of the navigability of streams; another as a source or power; another for irrigation; another as habitat for commercial and sport fishes; another as a breeding place for mosquitoes and a means of carrying away human and industrial wastes. Our national forests were created, for example, to protect the great watersheds. But what happens to that water when it leaves the watersheds and collects in rivers and lakes is an amazing and inchoate story.

Claude Wickard, Secretary of Agriculture, whose Department includes some of the conservation agencies, told the meeting that this country has no conservation program. Instead, we have a program of exploitation, under which one-third of our crop land is seriously damaged by erosion, our range land is over-grazed, our timber is being cut twice as fast as it is growing. He urged a program of restoration and water control based upon our accumulated knowledge.

This general observation was supported by the conclusions inevitably drawn from the statements of the various heads of service. If, however, others present left the meeting, as we did, with the profound conviction that there *must* be coordinated planning, then the gathering was worth while. But it will not have been worth the effort unless something is done about it.

It seems to us that the situation places a responsibility upon the conservation organizations to decide what *they* think should be done. They represent the informed and interested public, and, because they are informed and interested, can speak for the whole people, who own most of these resources. The bureau chiefs, commissioners and directors of the governmental agencies are the servants of that public. These active agents should be urged to get together on a *real* conservation program in the best interests of *all* the people, and not subservient to any special interest. Certainly, war has taught us the vital importance of natural resources, and that they must be used without waste, and with the utmost wisdom. We can no longer afford the profligacy of the past.

Nurse Killers

This white oak was nurse to nearly two hundred red cedars, finally dying as its nurslings throve in close ranks all about its base.

HAVE men been kinder to their nurses than to their mothers? Or is our language merely not rounded out? We have a word for mother-slayer—matricide—but none for a nurse-killer. On the same principle the term would be "nutricide." As the murderer here involved has every right to the cognomen, "Red," we could with justice write the headline—"Red the Nutricide."

More prosaically, however, our subject may be identified as the red cedar, juniper, or savin, a tree well-known almost throughout the eastern half of the United States. The epithet, red, alludes to the color of its heart-wood, which is rosy-red and odorous when first exposed, changing to dull red and losing its fragrance with age.

The tree's ability to kill resides in its conical shape when young, and in its tolerance of shade and tenacity of life. It survives in shade that most other plants can not endure, and bides its time. A pointed spire, it bores from beneath, pierces any less dense and less persistent growth, and often surmounts and destroys it.

Red the Killer does not agree with the author of "Woodman, spare that tree!" who said, "In youth it sheltered me, and I'll protect it now." No, he strangles, as soon as may be, the tree that sheltered him in his youth—his nurse. The nurse trees of red cedars may almost be regarded as foster parents, for it is due to their branches attracting perching birds that the junipers get started beneath them at all.

Nearly two hundred years ago Peter Kalm, the famed Swedish botanical explorer of eastern North America, noted that the red savin is spread chiefly by birds, which eat the berries and emit the seeds whole. Berries is a popularly, but hardly technically, suitable term for the fleshy modified cones of this tree. They have a white coating, and, although larger, resemble the fruits of the bayberry and are equally great favorites with birds. They are eaten in quantity at all seasons, but seem to be particularly relished in winter. The fleshy part of the berry alone is digested by most birds and the seeds are scattered far and wide.

It is a generally held opinion that the ranks of red cedars along fence rows are there because birds eject the seeds while perched on the fences. This is only a partial view of the matter, however, for in fields that are neither plowed nor grazed, we see junipers springing up everywhere. They hold their places in hedgerows and other lucky spots primarily because of the protection from livestock and farm machinery they receive.

Sometimes grazers are absent, and plows and their following implements are all the cedars have to evade. The tendency then is for colonies to spring up about stumps, which the plowman for obvious reasons gives room, and under large trees whose shade keeps crop plants from thriving. Such trees, as a rule, are too tall to be overcome by the boring-from-within tactics of the red cedars. But they are already old and the youthful junipers in time supplant them by the simple process of outliving them. During a first period, in full leaf, they seem strong and mighty patriarchs, but they die, doubtless in part because of root competition with the young trees matting the ground beneath them. Then their bare frameworks persist for a term of years, losing first twigs, then branches, and later reducing to pathetic forks and stubs. At length these topple to the ground and decay, yielding their last energies to the nurslings they have sheltered so long.

Among these beneficiaries, red cedars are usually prominent, but other trees and shrubs occur, especially those that have fleshy fruits, the seeds of which are scattered by birds. Under one old chestnut rampike I counted eighty young red cedars, more than a hundred cherry trees of two or three kinds, and

By
W. L. McATEE

Red cedars are scattered by birds, not only along fencerows and in the shade of nurse trees but also far and wide, as seen here.

seventy-seven of sassafras, amply bedded round with such vines as poison ivy, honeysuckle, and blackberry, in quantity.

For years I had my eye on another nurse tree, a fine old white oak, but procrastinatingly deferred the actual counting of the brood until a considerable degree of elimination had occurred among them and their fosterer had disappeared. It is herewith pictured in an incipient stage of the breaking up process. Red cedars seem to dominate the scene, but I remember well that young trees of sassafras and wild cherry were numerous. When I finally did get around to counting the trees, then thrice as high as shown in the photograph, I found: red cedar, one hundred ninety; black haw, twelve; wild cherry, four; holly, one; dogwood, one. Japanese honeysuckle covered the ground and festooned many of the trees growing in this assemblage.

Thus nurse trees of sufficient size may survive for a long time despite the competition of their nurslings. Those of small or medium growth, however, may be ruthlessly conquered in a few years. This seems to be the fate of apple trees especially. Their open growth is easily pierced by the more or less pointed and columnar cedars. They are deprived of light and sustenance and soon must yield. A clump of sprightly cedars surrounding a fallen trunk eloquently tells the tale. Red the Killer has had his way. Nurse is dead.

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The Alder

By F. T. BIOLETTI

Oh! Come with me, and in a morning's run
We'll greet the alder by the stream,
Deep in the somber cañon, where the sun
But dimly sinks his golden beam.

Oh! Come in spring, when alder's bridal dress
Of fine wrought laces filters rain
Over the trilliums and the water cress.
Oh! Come with me and come again.

Oh! Come in summer when her leaves are fair
And gentle as a dryad's breast.
Here shelter with the bashful maidenhair
And by the tiger lily rest.

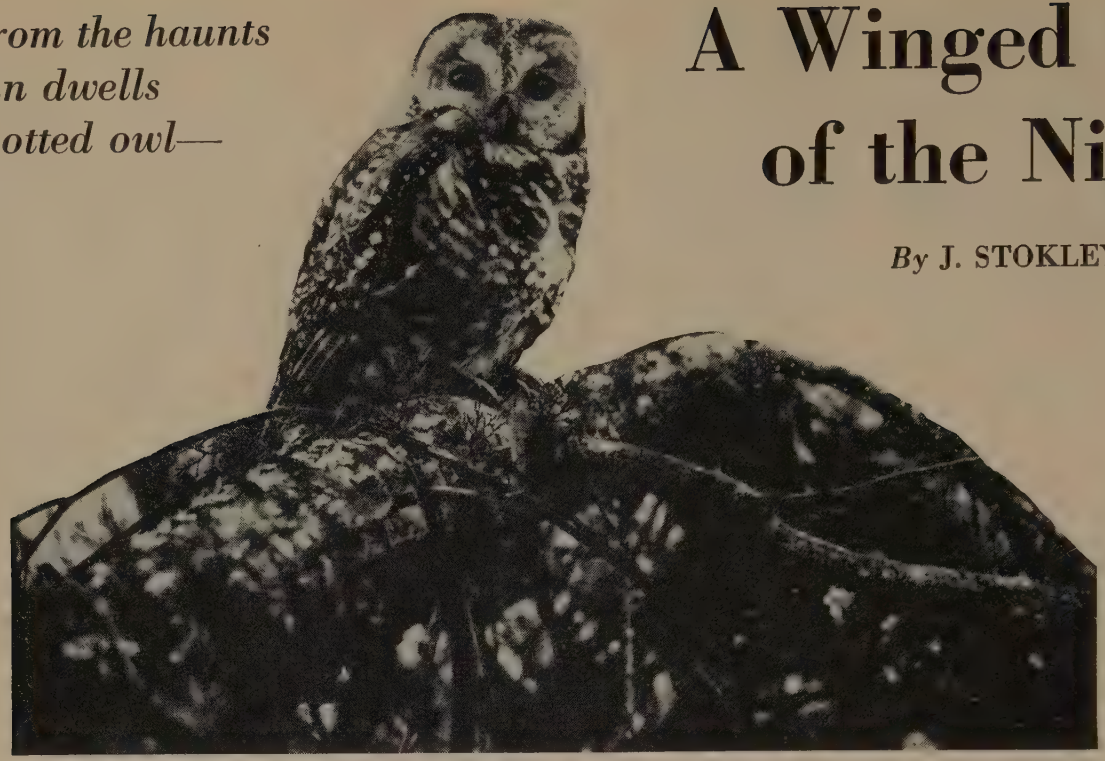
Lulled by the murmur of the dwindling rill
Here lie and slumber in the shade
Of alder's green. Here let us dream until
The nightjar come and daylight fade.

And come when winter's storms have torn away
Her verdure and exposed the runes
Engraven on her trunk in mottled gray
By learned gnomes in summer moons.

And see the arabesques, the mystic veil
Spun by the wood sprites from her crown
Of slender twigs, that from the trail
Against the dull gray sky limn clear and brown.

And know with me sweet alder's grace and charm
That soothe the heart, bring peace, and call
The weary soul to thoughts of Heaven and calm
Through summer, winter, spring and fall.

Far from the haunts of man dwells the spotted owl—



A Winged Cat of the Night

By J. STOKLEY LIGON

A NOISY concourse was in session in a group of spruces and firs that grew beneath the sheer rim of a canyon slope in the San Mateo Mountains. I suspected the cause of the racket, and a climb to the scene confirmed my suspicions. The leader of the gang slanted away on set wings to the dark recesses of the canyon below. One by one the others followed, jeering as they went. The peace disturbers of the mountain fastness were none other than vain, sarcastic jays, and the object of their attack was a pair of dozing spotted owls, sober as judges, sitting as dignified and rigid as the limbs about them.

My appearance on the scene caused nothing more than a temporary dispersion of the mob. The owls regarded me—if they regarded me at all—with phlegmatic indifference, although a distance of only a few feet separated us. The female, with one eye closed and the other almost so, feebly peeked at me through half-drawn lids. Her mate was close beside her with both eyes closely sealed, as if to shut out not only the dim light but the entire world as well.

They might have been indignant because of the scorn the jays directed against them, pointing them out to all other diurnal denizens of the mountains. If so, their stoicism cleverly disguised any such emotion, for they completely disregarded the jays.

The owls were there because of the pinnacles and crags above them and the daring canyons and broken upheaved fortifications that held at bay the press of conquering, civilized man. It was not because of any fault of wings that they admitted me to their presence. They fly gracefully, easily and as noiselessly as the falling of the snow, which from early fall to late spring over-spreads their domain and makes it more secure.

And so the pair whiled away the long hours of the autumn days, now and then scratching a beak, lethargically stretching a leg or wing, or adjusting some feathers as if to give further evidence of their apathy to things about them. But wait! When the shadows have fallen and the chilling air rises with the gathering darkness, they are off. Without warning one rips the black solitude with an unearthly call, answered by its mate from a nearby stately spire that perhaps has been used as a call station by their ancestors down through the ages. These weird signals send riotous chills through the veins of unsuspecting campers to whom these mountain foragers of the night are unknown.

Well it is for these unsophisticated mountaineers that their haunts are off the beaten path of man. Otherwise many would be the victims of thoughtless vandalism, for nothing more than a stick is needed for one to kill a spotted owl. So reluctant are they to leave an accustomed perch in some chosen spruce or fir, or in a secluded cave, that I have, in a few instances, caught them by hand—to my sorrow, I must admit, when the needle-like claws gripped my hands. Even when so caught and released the bird would fly to some nearby tree and soon would be engaged in adjusting his feathers. This westerner's haunts are Nature's enchanted castles, imposing hanging forests and deeply-carved waterways. No indictments have yet been preferred against him by man because he is little known, even by ardent ornithologists who are ever seeking out the rarer members of the avian kingdom. His seclusive retreats supply all of his

The mother spotted owl defiantly indicates her distaste for the invader of her nest site. Below, two spotted owls roost in solemn contemplation of the antics of the photographer.

wants. He makes no excursions to the chicken roosts of settlers in the adjacent foothills, and the game birds he passes by as being out of his line of dietetics. Here in New Mexico his food consists of man's universal enemies, noxious rodents—by choice the big wood rats that inhabit his range.

One needs only to become acquainted with their habits and the conditions eligible to their exacting natures in order to find spotted owls. In New Mexico and Arizona they occur in the Transition Zone, in which lower-altitude trees, the oak, pinyon pine, juniper and mountain cottonwood, mingle with the spruce and fir of the higher elevations, or at altitudes ranging between 6000 and 8500 feet. Not often are they observed outside of the spruce and fir belt. During the day they are almost invariably found in the deep, cool, shaded canyons. Cliffs and caves are nearly always conspicuous adjuncts to their favorite retreats. Caves are used not only as places of abode at all seasons of the year, but serve also as well protected nesting sites. Farther west (the species ranges north to southern British Columbia), these owls nest in the cavities of trees or in the renovated nests of hawks, and may inhabit dense forests down to sea level.

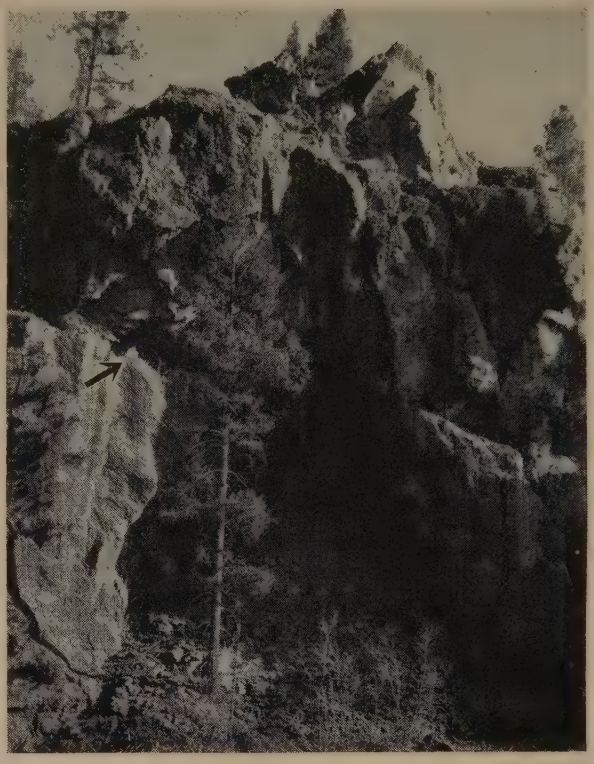
There are few authentic records of nests of the spotted owl having been found. However, I have had the good fortune to discover several containing eggs. The nesting places of the birds are not only in isolated situations, but are often in inaccessible caves or in pockets in sheer or over-hanging walls. One of the nests I found was accessible only by using an improvised ladder, but it afforded an opportunity to take photographs of the female bird, nest and eggs. This nest was placed on a shelf in the entrance of a deep, spacious cave, the opening of which faces the north and thus ever prevents the rays of sun from entering.

The nesting site was about thirty feet from the

floor of the cave, on a shelf about four feet wide. It might have been used for ages, being repaired each season to meet the simple needs of the tenants. As if placed there as a special convenience, a spruce tree, with perching limbs at the right elevation, grew in front of the cave, only a few feet away. Protection from all weather and marauding animals was insured by the overhanging roof of the cave and the perpendicular wall that towered above. Only a trained eye could locate the nest, as it was not visible from beneath.

When disturbed on her three eggs, the female offered no ruse to lead me away, as so many birds do; nor did she fly to safety. She came boldly out in the open to proclaim her rights of possession. At the time the nest was discovered, the male bird was sitting on one of the accustomed perches, of which there were several, as if systematically placed, on the wall of the cave. He seemed to have a high regard for his duty as head of the household, but courteously turned the quarters over to me.

When I climbed to the nest, the female snapped her bill defiantly and then flew down to one of the interior perches. For a time she nervously flew in and out of the cave, alternately alighting on conspicuous perches from which she directed her remarks of disapproval. The male bird answered her alarm calls from his place of security down in the thick spruces that flanked the canyon slope. This was the extent of his consolation in the hour of trouble. When I descended to the floor of the cave, the female lost no time in getting back on her eggs. She at first refused to stay on her nest when I crawled on the ledge near the nest but finally became somewhat reconciled to my presence. While watchfully waiting on one of the cave perches, she took advantage of the time to preen and adjust her feathers, carefully and deliberately going over them. But she did not fail occasionally to cast her big, round eyes up at me and the nest location. Now and then she would give expression to her dissatisfaction by uttering restrained call notes.



The nesting haunt of the spotted owl. The arrow points to the location of the nest and indicates its inaccessibility.

In order to induce her to pose on the nest, a spruce bough was secured and placed between the focused camera and nest, with an opening directly in front of the camera. It was soon evident that she had less fear of a green bough of her native wilds than she had of the photographer and his queer object on its three long legs. She was soon carefully covering the three eggs, with her head toward the camera, presenting that "look-pleasant" expression so much desired by photographers. The bough was later removed, but when I endeavored to draw a little nearer, she arose and reluctantly left the nest again.

While I was taking a close-up view of the nest and eggs, she flew back to the ledge and defiantly walked in, with feathers ruffled and eyes blinking, and sat down on the side of the nest as if suddenly possessed with renewed determination to guard her treasures. There she bravely remained, regardless of my movements. In this final act of undaunted courage she capped the climax and won my deepest admiration. I trust that she won out as well in subsequent encounters if any other intruder chanced to enter the bower that Nature had so bountifully endowed with protection.

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Refutation

By PAUL CHURCHER

"Winter's not done!"
I think it's plain
That little more
Than the tattered ghosts
Of her moods remain.

Spring has not come?
Doubter, explain
Away the wild,
Raw, gusty winds,
The mud, the rain.

Flowers in Wartime

By ANDREW S. WING

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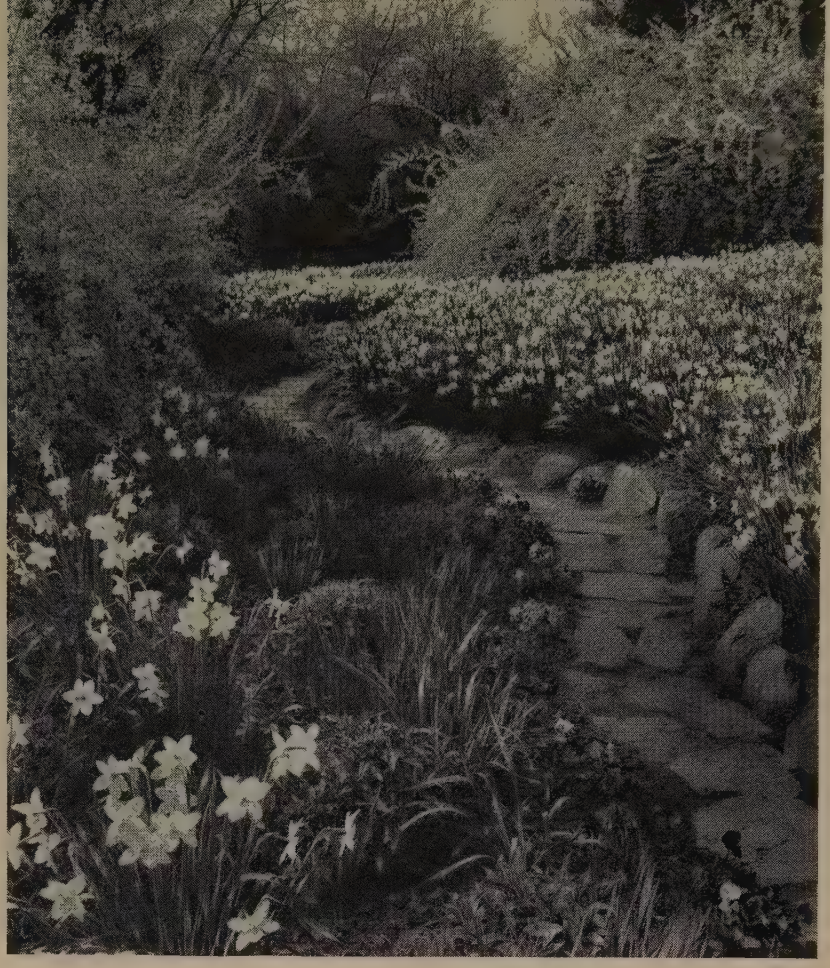


Spring bulbs and forsythia make a grand showing and require little care, leaving the Victory gardener more time for his work in the vegetable department. A naturalistic planting like this will last for years. Photograph by Richard Averill Smith.

GARDEN beauty and food too is a policy many gardeners are adopting this year. Last season the tendency was to go all out for food. Tomatoes were seen climbing over front verandas; sweet corn edged driveways; lettuce sprouted from window boxes that formerly housed ivy and petunias. Amazing results were sometimes obtained in such makeshift V-gardens, but more often than not the amount of food obtained hardly justified the sacrifice of customary beauty.

The philosophy is different this season, after a year's experience with all-out home food production. To be sure, we need the home-grown food even more than last year, but we are using more intelligent means of getting it. Instead of tiny, scattered plots, the food gardens are averaging larger. More vacant lots, nearby farm lands, or unused park space are being devoted to community gardens. That leaves more space in the small home grounds for flowers. And V-gardeners have learned, too, from experience or by watching enterprising neighbors, how to brighten the home grounds—including the food garden itself—without sacrificing the yield of food.

Not that a well-kept vegetable garden needs to be an eyesore—far from it. Part of our own lawn was dug up last season, and, except for a period when certain crops were maturing or badly riddled by predatory beetles, it looked most attractive. The foliage of many vegetables is decorative. These include parsley (for edging), carrots, eggplant, broccoli (for its color) and Swiss chard (particularly the variety Rhubarb), and kale. But a little ingenuity used in planning the kitchen garden by the addition of a few annuals, or other flowering plants, will work wonders in adding a decorative touch. Skillfully planned, these little touches of flower color will subtract almost nothing from the total vegetable yield for the season, except in the smallest of gardens. To do this we are merely taking a leaf out of the book of English cottage gardeners, who have been mingling vegetables, flowers and pot herbs in their miniature dooryards since before the days of Shakespeare.

"But what about the extra time and work involved?" I hear someone saying. "I almost broke my back raising vegetables last summer. Now you tell me to grow flowers in addition to vegetables."

A very good question, indeed, and for which fortunately there is a ready answer. You need not add a single extra row, nor do an hour's extra work in order to have a few flowering plants in your V-garden. Simply substitute a few annuals for a row of vegetables, preferably along the edge where it will show from the porch or house windows. Petunias, dwarf marigolds, sweet alyssum, dwarf or tall zinnias, and nasturtiums take little space and will give a finished look to the garden. Flowers for the table will be provided, too. If you manage the rest of your garden as you should, keeping it weeded, killing the bugs, and replanting each row with a new crop as soon as it is finished, you will not miss the small amount of

The old-fashioned perennial garden is always charming and demands relatively little care beyond weeding and thinning. McFarland photograph.

ground devoted to providing an accent on flowers.

In my own kitchen garden, even when I had plenty of space for flowers, I have always made a practice of having a few rows of annuals for cutting—zinnias, marigolds, cosmos, calendulas and others. In addition, certain annuals persisted in seeding themselves year after year. I welcomed these and let them grow in corners and wherever they were not in the way. Corn flowers, cosmos, mullein pink and hollyhocks have a way of inviting themselves in and staying as perennial guests. The only thing one need watch is not to turn them under when spading the garden in early spring. Rows of chives along the edge of a garden path have long been planted by many gardeners. Start with a single clump of chives and by annual division you will soon have enough to border a long path. Why so many chives? Simply because in spring they present you with a solid mass of charming light purple flowers in addition to providing delightfully mild, onion-flavored leaves for salads, soups and cream cheese. Other herbs, including parsley, also make neat, attractive borders.

One of the nicest V-gardens I saw last summer while judging a community plot in Far Rockaway, L. I., was extremely well planned so as to provide a continuous yield of fresh vegetables. Although it was only about twenty by twenty-five feet, there were several rows of bright petunias, golden dwarf marigolds and other annuals to add a touch of color. The judges unanimously agreed that this garden deserved a high rating; and the next best plot in the group was also one that had flowers in it. It was plain in both cases that the flowers were a *plus* quality, and that no yield had been sacrificed to make a place for them. Their owners had simply known a little more of how to do it, or had worked a little harder with their heads than they had with their backs.

But, since extensive flower plantings do require much time, labor and considerable materials that might better be used in the food garden, it is well to give thought to the ways of cutting down on the labor and cost of having flowers and other ornamental plants.

First of all, perhaps, should come flowering trees and shrubs. These usually require little care, aside from a bit of pruning, and are a fine sight from early spring right through the season, if the proper varieties are selected. Nor should the fruits be overlooked. Apple, plum, peach, and cherry trees make a grand show when in bloom, and, with a little care, will give you a fair yield of fruit for the table and for canning. Grapes are decorative, too, and even raspberries and the other brambles make quite an attractive shrubbery border in the back garden. A few roots of rhubarb will give you all you can eat and the plants are decorative with their lush leaves. Few insects will touch them.

Of course, such old favorites as forsythia, deutzia, mock orange, rose of Sharon, rugosa roses, and Japanese quince should be included. Do not overlook the finer shrubs, such as azaleas, mountain laurel, cotoneasters, and abelia, if they are suited to your soil and climate. Browse through the catalogs or visit a good nearby nursery for ideas on flowering shrubs and trees.

Evergreens have been widely planted for many years, and yet there are few gardens where a few of the better sorts could not be fitted in to advantage, even if it means digging up commoner and less interesting things. Both in winter and in summer, the ever-

A shrubby foundation planting that fits the house, gives beauty, and steals no space from the Victory Garden. U. S. Department of Agriculture photo.

green colors and forms add variety and character to the garden. And, of course, they are easy to grow, if the right sorts are chosen. Do not overlook the hardy yews, the better junipers, the spruces and the pines. Go slow on the arbor vitaes and the Japanese cypresses (retinosporas), which, with few notable exceptions, become ragged as they grow older, or are rusty in winter. We are considering the northern states here, of course.

Hardy bulbs are one of the wisest choices for the lazy gardener. Narcissuses, crocuses, hyacinths, tulips and the lesser bulbs all contribute their share of beauty. They should have been purchased and planted last fall, but some of them can still be had, although they may not bloom this season. Add to these the hardy lilies—tigers, umbellatums and the rest—for summer blooming. They will surprise you with glamorous beauty when you are not expecting it. You can plant other flowers, and even vegetables, close to the bulbs without annoying them, since they flower from strength stored up between seasons. But do not crowd them too much—they resent it.

Irises, peonies and phlox are indispensable in every hardy border. All these are more or less everlasting and their beauty is irresistible, if you like them, which most of us do. The medium-priced varieties are the best buys, usually, but scan the catalogs carefully to be sure of getting those that will wear well; cheap mixtures seldom pay. Such things as foxglove, Canterbury bells and delphiniums can be grown from seed sown in cold frames, or even in the open ground in a well protected bed that has some sun and good drainage. Or plants may be had from any good florist or seedsman. Strains and colors are more important than named varieties, unless your budget for gardening is adequate for the finest sorts.

The care of these perennial and biennial flowering plants is often less than that usually expended on some of the vegetables, since they are usually more resistant to attacks by insect pests and plant diseases. However, it is well to be prepared for some losses, since few plants are really fool-proof. Once established, there will be little trouble keeping them going, provided a minimum of care is given. A minimum of care includes fertilization with barnyard manure (if you can get it), a good complete fertilizer, compost, and cultivation sufficient to control weeds and to keep the soil in good tilth. Few insects will bother these hardy plants, and these may be controlled by spraying and dustings at the same time the vegetable crops are protected.

A few borders planted with the hardiest of perennials and biennials will give one a surprising amount of bloom. And it will be bloom that appears when the vegetables are not at the peak of their season. It will be mostly a plus quantity on the V-garden front. And instead of feeling unpatriotic for indulging in beauty when food is at a premium, you can say, "I grew my share of vegetables for my family and for the fighting forces, and flowers, too."

What more could the men at the front and your own friends expect of any Victory Gardener?

Poker Faces

By PHILIP MENARD

Birds seem happy little creatures,
Though you'd never know it by their features.

Opossums Get About

By CLAIRE DUMOND

How often have you heard someone wish for two pairs of hands? Opossums come rather close to this, and even a baby opossum has not only four versatile feet that serve as hands, but an agile and useful tail that is handy, too. Probably this is why they live to grow up, although life with the 'possums is truly a catch-as-catch-can existence.

The safest stage in a baby 'possum's life is when it is snug and warm in its mother's pouch. Meals are served at all hours, and it is practically impossible to fall out of its cradle.

When first born, opossums are so tiny that you can hold an entire litter in one palm and close your fingers over them easily without disturbing their slumber. A litter varies from six to eighteen, with an average of nine being usual.

We raised five young opossums whose mother was killed by a switch-engine. Opossums are slow thinkers, and I presume the mother was trying to decide whether to cross the track. The train did not hesitate, and when she was found four of the babies were dead. The other five were clambering over her trying to get back into the pouch.

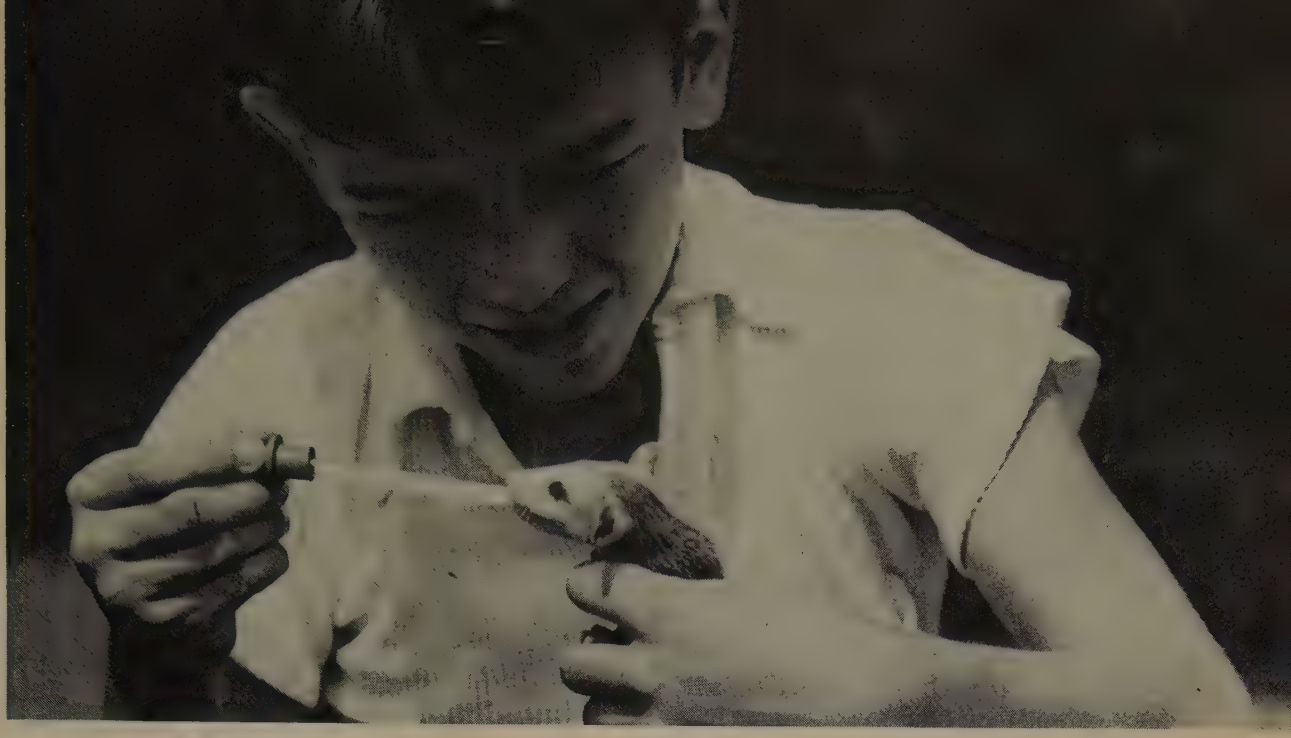
Warm, diluted milk, sweetened with corn-syrup, was fed to them from a medicine-dropper. They were ravenously hungry and ate until their stomachs bulged, whereupon they curled up together to sleep.

These quintuplets were no trouble to raise and grew rapidly. Soon they could drink their formula from a saucer, and eat chopped liver and hamburger. Activity increased with age. We made them a home in a canary breeding-cage, where they climbed over the bars and swings like tiny acrobats in a circus. They liked to scramble up the wires of the cage and swing by their tails from the perches.

Young opossums' toes are flesh-pink, but the soles and backs of their paws are black, giving the appearance of fat pink fingers protruding from black lace mits. The fur on their backs is dark gray, shading to white on the lower parts. Their faces are white with slanting dark eyes, and their noses and ears are the same pink as their toes.

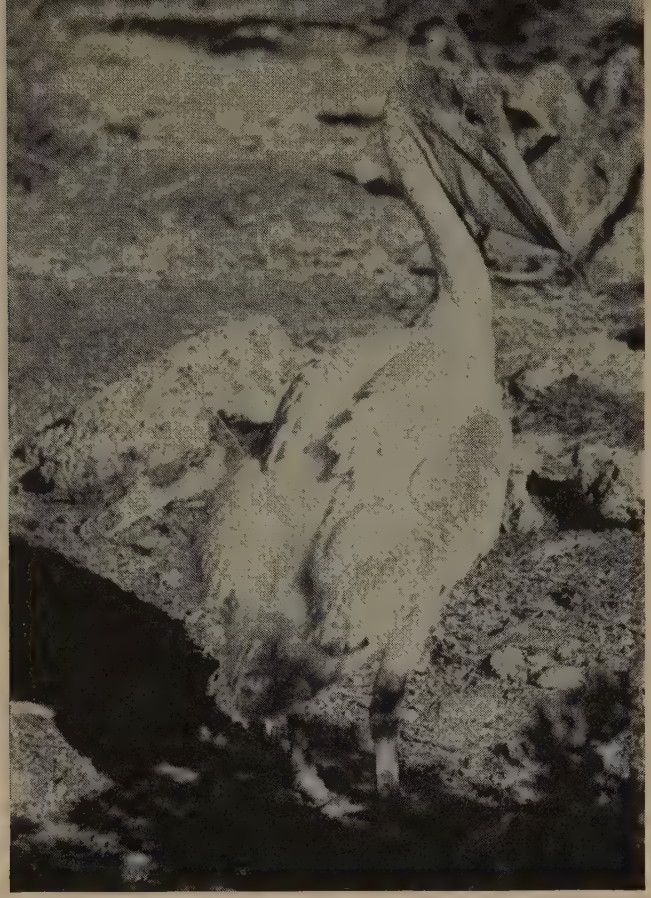
The babies were so active that they never stayed long in one place. They would separate and go five different directions at once, usually ending their trip on top of someone's head. It took two people to manage them then.

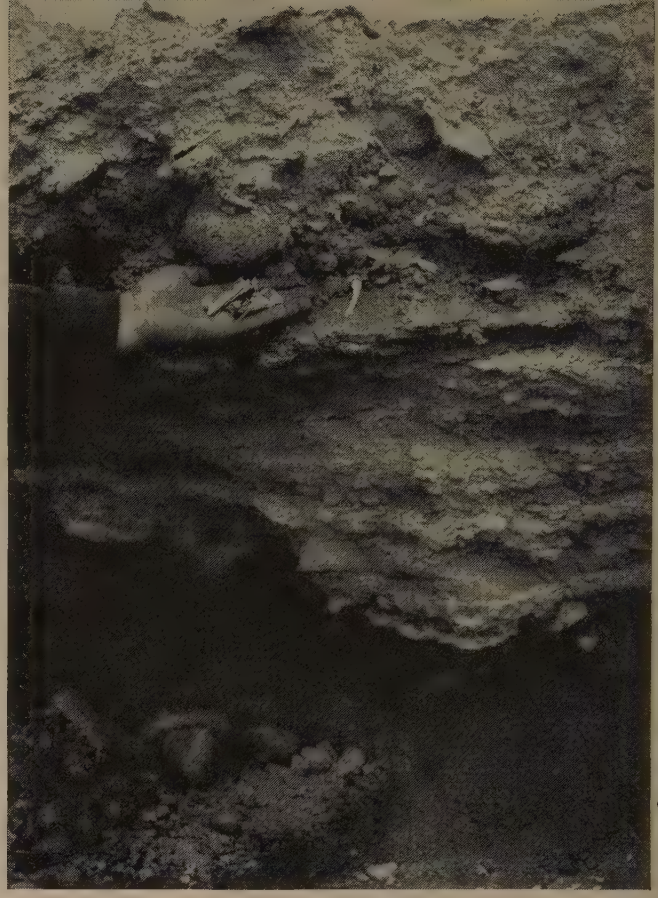
While opossums were originally confined to the southern and middle United States, they are great wanderers and are gradually extending their range northward. Many a hiker of the future will be fortunate enough to catch a glimpse of a mother 'possum trotting busily along the trail with her young clinging like strap-hangers to her back and her up-curved tail.



An eye dropper served as the nursing bottle for the motherless opossums, who took quickly to this method of feeding. On their specially-prepared diet that was worked out for them, they prospered and were soon able to demonstrate their ability at acrobatics, hanging by their tails and looking at the world from an inverted position.

The marsupial pouch of the female opossum is equipped with all the comforts except a zipper. In the illustration five blind and naked young are shown at the pouch opening. Normally the pouch remains closed without benefit of zipper and there is no danger of the youngsters falling out of it. Photographs by Frank L. DuMond.





A half-grown white pelican on Anaho Island in Pyramid Lake. Birds of about this age contributed a large share of the bones found in Rattlesnake Hill (right), where they lay in Lahontan sediments immediately above the calcareous layer. Photographs by Dr. Richard M. Bond and W. C. Matthews.

Pelicans of the Past

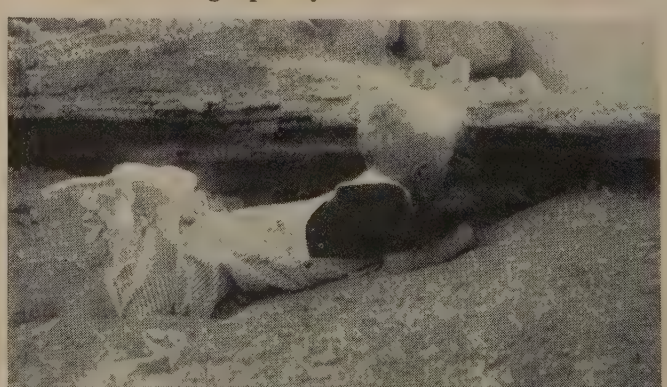
By E. RAYMOND HALL

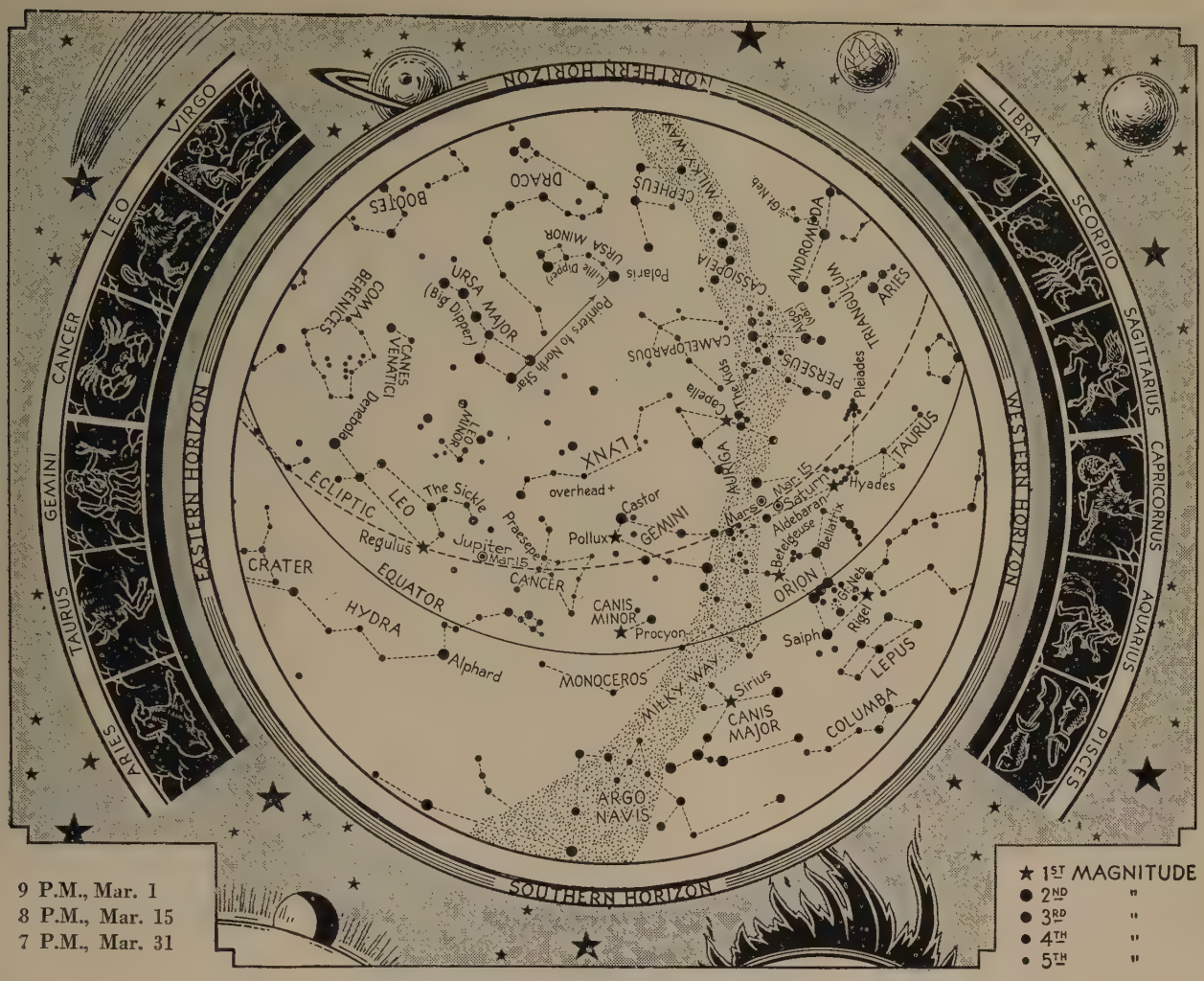
STRANGE birds are these pelicans, whose white cloaks, with jet black cuffs, are surmounted by unbelievably grotesque orange head dresses, like the long-nosed masks of aboriginal witch doctors. Still, their strangeness harmonizes with their surroundings, and the whole only heightens my impression of great antiquity there below my vantage point on the eastern flank of the Virginia Mountain Range. Looking beyond, far into the Nevada haze, and then down again at the line of big birds winging their way across the blue face of Pyramid Lake, I speculate, with a certain reverence and humility, on the innumerable years that have elapsed since the first of their kind found secure haven in this ancient desert. Then as now they sought some island on which to nest; my eyes mark one after another low mountain top that in centuries past protruded above the waters of the Pleistocene Lake Lahontan, of which Pyramid Lake is but a remnant left by passing geological age.

Although on a few of these eminences I looked, in a casual sort of way, in the days that followed, for bones or other evidences of a prehistoric nest-site, never did I find one until vacation returned me to this desert fifteen years later. We found the bones then—more than four hundred of them—near the top of Rattlesnake Hill. Back at the laboratory, with the necessary books and specimens for making identifications, roughly three-fourths of the bones proved to be of the white pelican, *Pelecanus erythrorhynchos*, and most of them were from immature birds. The remaining bones were mainly of adult double-crested cormorants, although one was of a Canada goose, and many smaller bones were from fishes of several sizes and of more than one kind. The bones, although fragile, were partly fossilized; minerals from the envelop-

(Continued on page 162)

One of the most useful tools for recovering the bones from the deposit was Dickie Mills, age 3. Photograph by Laura E. Mills.





To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south. Time given is Standard Time; add one hour for War Time.

Some Strange Variable Stars

By ISABEL M. LEWIS

All stars do not shine with steadfast light. Stars that show strange fluctuations and variability of light are now known to be very many in number. There are explosive stars, pulsating stars, eclipsing stars, and stars that are just plain erratic in their behavior.

Before the days when large telescopes were in use only a few stars had been found to be variable in light. Now the study of the variable star has become an important field of astronomy. There is even a large society, the abbreviated name of which might be mistaken for that of some government agency. This is the A.A.V.S.O., the American Association of Variable Star Observers, which is devoted to the study and interpretation of the peculiarities and vagaries of the variable star.

The most sensational change in stellar brightness was undoubtedly the outburst of Tycho's Star in the year 1572, before the invention of the telescope. It appeared with great suddenness in Cassiopeia, in a place where no star had ever been seen before. For some days it was a rival of Venus at her best and was visible even in broad daylight. Its brightness then waned gradually and in sixteen months it disappeared from view. With the telescopes of today it probably would have been observed some months longer. It is uncertain whether it is one of several faint stars that are near the position determined by Tycho Brahe, Danish astronomer, whose interest in this star was so great that it was named for him. Tycho's Star is the most illustrious example of a large class of stars known as novae, or temporary stars. Scarcely a year passes that one or more stars of this type is not discovered. Now, with the aid of the most powerful telescopes, novae in far-distant island universes are discovered, extremely faint even at their maximum

outburst of light, in some cases, because of their great distance from the earth.

Novae are the explosive stars and the source of their temporary outbursts of abnormal brilliance appears to lie at the surface or in the atmosphere of the star. In some instances expanding shells of light have actually been observed surrounding the star at a later stage. The fact that in most instances the star eventually returns to its normal brightness, or nearly so, suggests the superficial nature of the explosion. It is usually white, or bluish-white, stars that become novae and they occur where the star density is greatest, as in the Milky Way, and sometimes near dark or light nebulas.

The star Mira, The Wonderful, or Omicron Ceti, as it is also known, in the constellation of Cetus, The Whale, was the first star that was observed to change periodically in brightness. This was as far back as 1596, when Fabricius noted a third magnitude star that he could not find in any catalog. In 1603, the astronomer Bayer, without knowing the star had been found variable by Fabricius, listed it in his catalog as Omicron Ceti. Mira goes through its cycle of light changes in about eleven months. At maximum it is generally of third or fourth magnitude and has been known to become as bright as second magnitude. Mira is a red giant star of enormous size and very low density. If placed at the center of the solar system the earth would lie beneath its surface. It has a faint, white dwarf companion star.

There are about 1,300 stars found to be of much the same type as Mira. They are known as long-period variable stars, although there are other long-period variable stars that are not of the Mira type. Most of the radiations from Mira stars is in the infra-red and not visible to our eyes, which see only about five percent of the total radiation from these low temperature stars when they are at their brightest. As the star cools our eyes see still less of its light, for the amount of the infra-red radiations increase. The atmospheric temperatures of these stars are so low that a veil of clouds form, composed of minute solid and liquid particles, and this cloud grows thicker as the temperature decreases. This accounts for the decrease in the light of the star between maximum and minimum brightness.

Mira stars, as well as the large class of stars known as Cepheid variables, are pulsating stars. The Cepheids form a huge and valuable, as well as interesting, groups of stars named after one of their members, Delta Cephei. All the changes noticed in these stars are believed to be the result of periodic expansion and contraction of the stars, which produces periodic changes in the surface temperature of the star, its color, and its spectrum. There are short period and long period Cepheids. The short period ones are also called "cluster type" variables because they are numerous in the great globular star clusters. They go through their light changes with the greatest regularity in periods of only a few hours. The shortest period is only one hour and twenty-eight minutes but the average period lies between nine and seventeen hours. There is a gap between these stars and the stars that have periods of a week or so, the long-period Cepheids, similar to Delta Cephei, which pulsates in a period of five days, nine hours, with a variation of light of more than half a magnitude.

The great value of the Cepheids lies in the fact that they follow what is known as a period-luminosity law. Cepheids of different periods are of different intrinsic brightness. If the period of light change is found, the intrinsic brightness of the star is known. Then if the *apparent* brightness of the star is measured or known, the distance of the star can be found, or, if the star is in an island-universe or globular cluster, the distance of that object from the earth is known. On such a simple relationship between the period and brightness of such stars rests the measurements of the distances of the Magellanic Clouds, the Andromeda nebula, the great globular star clusters, and many other far distant objects in which Cepheids are found.

Algol, The Demon Star, belongs to that large and interesting group of stars known as eclipsing variable stars in which two stars are physically connected and in mutual revolution, and, as seen from the earth, one star periodically passes between us and the brighter, or principal, star and temporarily cuts off part of its light. The variability of these stars, unlike that of the Novae, the Mira type stars, and the Cepheids, is not caused by physical changes in the stars or their atmospheres but by the mutual revolution of two stars as viewed from the earth. Viewed from some other position in space these stars would not be variable. Algol, or Beta Persei, to give it its astronomical name, remains unchanged in brightness for about two days, eleven hours. Then, in five hours, it loses two-thirds of its light, and recovers it (Continued on page 164)

The Stars Lean Close

By LUCILLE EVANS

Tonight the stars lean close, as though aware
of earth's cold terror. Scintillant and white,
their beams have raced through ebon lanes of light
to touch the anguished ones. The very air
flows tremulous with hope, and man may dare
to lift his eyes beyond this cosmic blight
to where Orion burns, where Vega's light
vies with the timeless flame of high Altair.

Lean closer still, white brothers of the earth!
Unleash your cleansing winds and let them sweep
away the venomous wrongs, the aching scars—
send us a mighty dream of man's rebirth,
a proud, bright vision that the soul may keep,
and bid us claim sure kinship with the stars!

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V-Garden Data

Because the National Victory Garden Conference, held last November under the auspices of the National Victory Garden Institute, developed so many talks helpful both in the promotion and practice of victory gardening, these have been gathered into a 56-page booklet. This publication is of particular value to leaders concerned with organizing V-Garden programs and in need of facts. Copies are available from the Institute, 598 Madison Avenue, New York 22, New York, for ten cents.

Michigan Shrubs

Shrubs of Michigan. By Cecil Billington. Bloomfield Hills, Michigan. 1943. Cranbrook Institute of Science. 249 pages. Illustrated. $2.50.

Described as Bulletin 20 of the Cranbrook Institute of Science, and a publication in "an endowed series designed to promote understanding and knowledge in the fields of the natural sciences," this book is a guide to the identification of the shrubs of Michigan. Following introductory discussion of shrubs, their value and form and structure, the author provides a valuable series of drawings of the parts of a shrub that are keys to their identification. Thus he makes the book useful to the beginner, and the botanical descriptions of the shrubs that follow are intelligible to the layman. Each description is accompanied by a drawing and a map showing the distribution in Michigan. A glossary and a bibliography give added value to a book that appears to have overlooked nothing that would make it useful to anyone interested in Michigan's shrubs.

No Soap!

In the rotogravure section of this issue is a page of pictures of soap sculptures that won prizes in the nineteenth annual competition sponsored by Procter and Gamble. The text with this feature states that the twentieth annual competition is "now going on and will terminate during May." It is *not so.* The rotogravure section had to go to press before Procter and Gamble made up their minds about carrying on the competition in wartime. We gambled that they would do so and lost. The need for soap conservation made it inadvisable to continue. However, the National Soap Sculpture Committee, 80 East 11th Street, New York City, has received so many requests for soap sculpture material from organizations devoted to recreational and welfare work with men and women in the Service, particularly in hospitals, that it is making available existing instructions to those who request it. Educators, also, have found this activity valuable, and the material is available to them. But, we repeat, *the contest is not being conducted in 1944.*

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The School Page

By E. LAURENCE PALMER

Professor of Rural Education, Cornell University, and Director of Nature Education, The American Nature Association

SO WE'RE GOING TO HELL?

In a current Yearbook of a division of the National Educational Association, I made a statement to the effect that I felt that in the handling of the problem of wise use of soil resources inadequate emphasis was being given by many to the known possibilities of soil restoration. A most vitriolic letter has come to me from a well-known conservationist asserting that in pointing out the possibility of soil restoration I am defeating all of the efforts of the Soil Conservation Service and licensing a profligate wastage of the remaining valuable topsoil.

At a recent meeting of conservationists held in Washington, Hugh Hammond Bennett, Chief of the Soil Conservation Service, stated that through improved management of soils the yield of agricultural products had been improved to the equivalent of the yield of a million additional farms. This is in entire keeping with my statement that offended my critic. We know that fertile topsoil can be developed in many cases. We should not close our eyes to these opportunities.

If I had any desire to oppose the highly commendable efforts of the Soil Conservation Service, I would be greatly honored to think that one statement of mine in a relatively small publication could in any appreciable way defeat their combined and accumulative efforts. I lack the wish to do anything but cooperate with the Soil Conservation Service in every way, and I doubt if it shares my critic's philosophy that educational effort should be directed solely to avoidance of waste of any renewable resource. If I felt that our future, so far as our soils were concerned, rested only on the use we may make of the good soils we may still have, and that our days of national prosperity were measured only by the silts in our streams and the dust in our eyes, I should feel that the title of this article expressed a statement of fact. I do not believe that this is so.

We Know How

We know how to bring back to optimum abundance most of the renewable resources. If we really want them, we can have forests of adequate size and quality, ducks filling the skies and our waterways, quail singing from plenty of fence posts, and soils that yield us a wealth of crops while they increase in quantity and in fertility. We can, if we use the knowledge we now have, make our streams and waterways yield more fish than they did before we took responsibility for their management. We can make fixed nitrogen from the air to an extent undreamed of by our grandparents. We can explore the heights of the stratosphere, the depths of the hydrosphere and the hinterland of the "dark" continents as no other generation could. We know how to get the necessary food and raiment from wastes that were considered unavoidable by our immediate ancestors. We can harness the heat from the sun to warm our homes. We can freeze the surplus foods of summer to tide us through the winter to such an extent that we may expect the transportation interests of the future to fight these innovations, which may reduce the need for moving fuel and food from the remote parts of the world. We can make or can break most of the units of Nature with which we come in contact, and are beginning to believe that we can even "put in their places" those of our own race who would enslave the weak and who consider themselves master men. We are beginning to become masters of our fates and captains of our collective souls. We are not doing it by crying over spilled milk or by sitting tight on whatever wealth we may have. We are doing it by producing more milk and more wealth by our own efforts and by cooperative effort—we hope of an intelligent nature. Misers and mendicants can never build a wholesome world.

Marking Time

I have a friend in the South who is perfectly able to make a good living. Through a fortunate "break" a few years ago, he was able to get together enough means to "see him through this life" if he does not spend too much. He spends most of his time figuring out how he can keep his expenses down and make the tax collector think he is poorer than he really is. With half the effort he spends on trying to cut his expenditures, he could increase his income to such an extent that he would have no worries. As it is, he is probably one of the most unhappy persons I know, firmly convinced that he and all the rest of the world are going to hell as fast as is possible. He is like my conservationist critic who would waste nothing, spend nothing, enjoy nothing, and apparently produce nothing. I cannot accept the philosophy of either.

As a teacher, examine your own conservation philosophy. Do you bemoan the dodo, the passenger pigeon and the whale, and do nothing to improve the survival and multiplication of the neighborhood quail? Do you let your tears increase the volume of a silt-laden river, and do nothing to hold the annual precipitation of your region for wise use and distribution during times of drought? Do you decry wholesale wastes by any political group and then vote the way you always do, just because you have always done so? Life is not static. It never can be. Change is and always has been the order of the day. The only thing we can do about it is direct the change along lines that are in keeping with our convictions. As the army man says, "You've got to git or git got," and if we do not direct a reasonable amount of our efforts to building our resources, we shall sometime find ourselves in a most uncomfortable situation. The surest way to get into trouble and to be unhappy is to sit tight on what we have and cease building.

Let's Look Ahead

Look through the textbook, study outlines and other sources of material you may use to help you in your Nature Education work. Evaluate it in terms of whether or not it preaches the philosophy that the world in general is going to the dogs. Look ahead and picture what it really means to continue any support you may have given such a policy. Then, against this, outline a constructive program in which you learn for yourself, and help others learn, how to be responsible for greater resources instead of less. Compare the expression of the builder with the expression of the miser. Practice your arithmetic, doing problems in addition in black ink instead of working on subtraction in red ink. To be sure, the buffalos have vanished from the plains for the most part. But in their places are other animals of equal or greater value. If we needed the buffalo back we could get them, and if we need rich topsoils, we can get them. We are even told of a farm in the home state of my critic that was reclaimed "in seven years from eroded hills into one of America's richest farms." I am not concerned with whether or not we can make a rich farm from an eroded hill in seven years—in fact, I rather doubt it—but I am concerned with whether we are making better farms. It is direction rather than speed that is the important thing, and I for one am convinced that we cannot go forward by merely not going backward. Nor do I believe that a majority of our people want to be parasites on the wealth of the present or of the past. Religion for most of us has gone beyond the hell-fire and damnation period. I believe that conservation has progressed similarly.

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Wildlife Report

The greatest southward flight of ducks, geese and other migratory birds since 1910; large kill of big game animals despite ammunition shortage; steady comeback in most commercial fisheries; more carp, burbot, shark, mussels, squid and skate on the American menu; tremendous increase in domestic rabbit production; first steps to check the downward plunge of oyster production—these are among the year's developments reported pridefully by the United States Fish and Wildlife Service. Some recovery of mourning doves, especially in the eastern states, is noted, and the woodcock shows signs of recovering, the Service says, counselling careful management of both species. The waterfowl populations are said to have increased from 27,000,000 in 1934 to between 115,000,000 and 120,000,000 in the spring of 1943. Northern breeding grounds are reported in excellent condition, and the refuge system is being used by millions of birds in migration. Looking ahead to after the war, the Service urges the States to make every effort to keep their populations of wildlife and fish on a high productive level because a sharp post-war increase in hunting and fishing is anticipated.

Forest Appraisal

With the new year the American Forestry Association has launched a nationwide appraisal of the war's effect on the forest resources of this country. The study is being carried on to the end that "postwar reconstruction and problems of forest management and land economy may be dealt with on a factual basis." The study is being carried on under the direction of John B. Woods, forester and timber valuation expert. He will be assisted by an advisory council of five members who are leaders in state and federal forestry, forest industry and agriculture. With a state as a study unit, forest appraisal consultants will be located in each of the forest regions of the country. They will assemble and analyze information available from local and national sources, undertaking such field work as may be necessary to round out and bring down to date the forest land picture by states and regions, and for the country as a whole.

Oregon Wild Area

Designated at the "Gearhart Mountain Wild Area," 18,709 acres of land in the Fremont National Forest, Oregon, have been set aside in wilderness status. This is one of the largest timbered roadless areas remaining in southern Oregon. It is rugged country with fine mountain streams and peculiar geological features, and is admirably adapted for wilderness recreational uses. No road building or commercial development will be allowed in this wild area, the Forest Service announces.

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VARIETY IN THE VICTORY GARDEN

(Continued from page 136)

"lentiles," look like large bean pods with two very large beans in them. They have about the same food value as beans.

Perhaps you would like to try another Biblical member of the "vegetable kingdom" in your garden. In the book of Isaiah we read, "Doth he not scatter the cummin, cast in the principal wheat and the appointed barley and rice in their place?" Cumin, or cummin, is used for flavoring pickles and soups and, in some countries, pastries. Pliny calls it the best appetizer of all condiments. It was used during the Middle Ages and considered of enough importance to commerce to be among the articles of merchandise taxed in London in 1419. The French use the seeds in cooking. Find out whether you agree with Pliny's estimate of the plant.

Would you care to try the scorzenera or black salsify? It has the same oyster flavor as the more familiar oyster plant, both attaining that flavor after the coming of frost. The black variety was praised in 1612 in *Le Jardinier Solitaire* as the "best root which can be raised in gardens." It might be interesting to see if your opinion is the same as this.

You will enjoy watching the growth of the turban squash—"the squash within a squash." When the plant matures, there is a withered stem like a tassel curving jauntily over the top. Haroun-Al-Raschid himself could not boast of anything more striking in the way of a headdress.

In our country, the skirret is seldom planted, but it would give variety to the garden because of its unusual root structure. There are bunches of three or four long, jointed roots. These are combined in one large bunch. The objection to the plant is the hard core, which must be taken out before cooking. If it is well grown, the outside will be tender. The seeds may be sown in August or the spring.

Still digging among the roots, we find the rampion, whose seeds are thought to be the smallest of all the kitchen garden seeds. It has been spoken of as a desirable winter salad. Its long radish-like roots and its leaves are both used in that way. Serving "radishes" a foot or more long would be a novelty, so you might spring a surprise by putting a plateful of the whole roots on the table.

Then, as you have gained confidence through experience, you may wish to try a European favorite, witloof, which is a form of chicory. We are directed to plant the seed in May or June in the open ground. In the fall, the leaves should be cut off and the roots dug up and stored in soil in a cool, dry place. Boxes in which they can stand upright with sand between the roots are recommended. The white sprouts are considered a great delicacy as a winter vegetable.

Last of all, consider your family cat. I can almost hear Tom and Tabby begging you to save some space for their favorite catnip. They plead for catnip, catmint, *Nepeta cataria,* or, according to Gerarde, *Menthe felina,* reminding you that it is recommended not only as a "cure-all" for cats' diseases, but a remedy for colds and indigestion if a tea is made from its leaves.

If there is difficulty in finding mention in the catalogs of the plant or plants you have chosen, write to the Library, Department of Agriculture, Washington, D. C. Their large collection is almost certain to show at least two nurseries that will have what you want.

And now, good luck and happy gardening to all who are planning to hasten Victory by way of the vegetable patch. May your storeroom bulge with plenty and the filled jars increase and multiply on your pantry shelves!

PELICANS OF THE PAST

(Continued from page 156)

ing sediments had replaced some of the original bone-substances. Another clue to their origin, barely noted at the time we unearthed the bones, was that about a third of them were water-worn. The egg shells all were in fragments, but their curvature and microscopic texture showed that they were laid by pelicans.

Contemplation of these remains recalled to mind a nesting colony of white pelicans found on that first visit, fifteen years before—a colony that could have provided identical animal remains. Innumerable fish, discarded by the pelicans, lay about in the colony, which extended down to within a dozen steps of the water's edge where, every day, black cormorants came to sit on four low, partially-submerged rocks, and once sixteen Canada geese swept past my blind to alight on the gravel bar and then waddle by the evenly-spaced white pelicans, each patiently at its appointed task of incubating two white eggs. In the ensuing weeks dozens of young pelicans, and occasionally an adult pelican or cormorant, died there. At this very time one had only to drag his boot through the sand to uncover bones left by deceased members of the previous years' nesting colonies. With a slight rise in water level, wave-action would cause the bones to become water-worn.

The bones and egg shells in Rattlesnake Hill mostly were in an eight-inch stratum of sand and slightly water-worn gravel, overlaid by a hard calcareous deposit some five inches thick. The last clearly was formed in water. Above this were four to six feet of surface sediments varying in nature from place to place. The two underlying strata extended through the entire hill, as revealed in the numerous excavations made months before to obtain sand and gravel for paving the streets of Fallon. The generous measure of bird bones in the thoroughfares of this town gives it an ornithological distinction quite unique, I am sure. Nevertheless, the lives of its residents who daily walk these streets appear to be totally uninfluenced thereby, and, as for myself, walking along one of them is more apt than not to leave me with only a kind of remorseful indignation that so many fine bone-specimens were lost to science. Even so, from this nesting colony, occupied long before white men knew the place, we recovered evidence enough to show that the white pelican's bird associates and its own way of life were about the same long ago as they now are at nearby Pyramid Lake.

Prize Fund

Convinced that "the greatest hope for our Republic in the future depends upon raising a generation that is biologically-minded," C. M. Goethe of Sacramento, California, has taken a practical step toward achieving this. Having observed the fine work and splendid results attained by directed Nature guiding at camps conducted by Mrs. Goethe and himself, and at the Girl Scout camp at Calveras Grove Big Trees, supervised by Mrs. Hilda Grinnell, Mr. Goethe believes that every incentive should be given to such activities. Accordingly he has sent a check for one hundred dollars to the Secretary of the American Nature Association to be devoted to providing *Nature Magazine* as an award to young people doing outstanding work in the Nature field at Girl Scout, Boy Scout, Campfire Girl or other similar camps. Mr. Goethe has started the ball rolling with the suggestion that "you might find others who would care to join in such work." We are setting aside his contribution for the allocation of fifty subscriptions to *Nature Magazine* later on in the year. The American Nature Association will do its part to keep the ball from gathering any moss by making these subscriptions—and any additional ones that may be underwritten—available at two dollars instead of the regular three dollars. Although Mr. Goethe may not like it, we will call this the Goethe Camp Fund. Do you want to help it grow?

Yosemite Fishes

Fishes of Yosemite National Park. By Willis A. Evans. Yosemite National Park, California. 1944. Yosemite Natural History Association. 20 pages. Illustrated. Twenty-five cents.

This is a special number of *Yosemite Nature Notes* devoted to describing the five species of trout and other lesser fish to be found in this Park's waters. An identification key is provided as well as information on trout foods, natural reproduction, trout culture, artificial propagation, egg-taking, hatcheries, fish planting and the history of the Park fisheries program.

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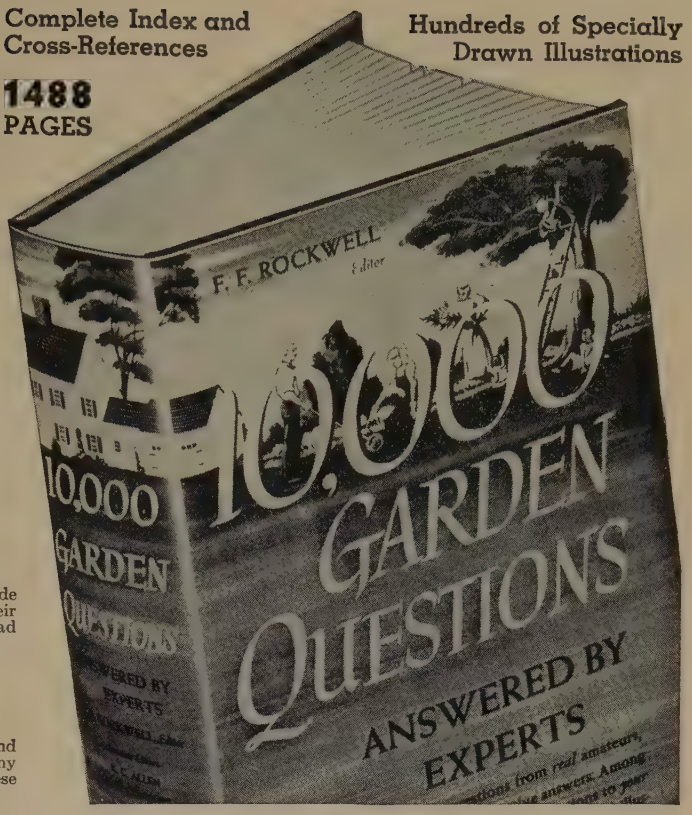

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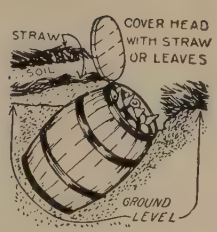

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SOME STRANGE VARIABLE STARS

(Continued from page 158)

in the next five hours. These light changes take place with the greatest regularity in a period of two days, twenty hours, forty-nine minutes. Nearly three-fourths of all eclipsing stars are of the Algol type and are often called Algol variables. The shortest period is less than five hours, the longest twenty-seven years. If the two stars are almost in contact there is a different type of light change, and stars that show it are said to be of the Beta Lyrae type, being named, as in the case of the Cepheids, for a star that shows this characteristic.

Among the erratic stars, are the irregularly variable stars, such as Betelgeuse or Alpha Herculis, usually red giant stars; also stars that appear to be intermediate between novae and variable stars. The star P Cygni has been called "nova-like." Now a fifth magnitude star, it increased twice in the 17th century to third magnitude. The light of the star RR Tauri undergoes, at times, sudden light changes of two or three magnitudes in a few days. Some erratic variables are in regions where there is much nebulous material, either bright or dark. Nearly 100 irregularly variable stars have been found within the region of the Great Nebula in Orion, others in the Pleiades, and in a patch of dark nebulosity in the vicinity of the Southern Crown. Strangest of all strange stars is R Coronae Borealis, which is the most erratic of all erratic stars. It may remain constant for years and then suddenly, at any time, drop any number of magnitudes, at times seven in a month. Nothing about this star is so predictable as its unpredictability.

The planets Mars and Saturn will be in conjunction in Taurus on March 7, when Mars will be about three degrees north of Saturn. On March 10 Saturn will be in quadrature with the sun and on the meridian due south at sunset. Mars also will be in quadrature with the sun on March 13.

Jupiter is in The Sickle in Leo a few degrees northwest of Regulus. It is moving westward, or retrograding, and its position changes very little during the month.

Venus remains in the morning sky but is gradually drawing closer to the sun. It is a brilliant object in the eastern sky, rising about two hours before the sun the middle of the month.

Mercury is not well placed for observation this month as it is in superior conjunction with the sun on March 17.

On March 20, at 1:49 P.M. Eastern War Time, the sun will cross the equator coming north and spring will begin in the northern hemisphere.

Caribou Killing

Editor, Nature Magazine

The recent publication by *Natural History*, and the November condensation in *The Reader's Digest* of Donald Culross Peattie's article "Old Man Buffalo," should be a reminder that another great provider is rapidly being decimated.

No one will be able to write, as did Mr. Peattie, of the glorious way he went down fighting, or of his grandeur of stature, skill and prowess, but nevertheless he has been and still is a bountiful provider, without which many a miner, traveller, trapper and most important of all, camps of natives, would have starved or frozen to death.

His name is Curious Caribou.

Many years ago, before white men came to excite his insatiable curiosity, he was as numerous as "The Monarch of the Plains." His range was greater than the buffalo; within the memory of present day Minnesotans, he was present, and he could be found, or one of his brothers could be, in great bands as far as the Arctic Coast.

Just as the Sioux were dependent upon the buffalo, the far-flung Athapascan tribes followed, and still, to some extent, move with his migrations, and were dependent upon Old Curiosity's bounty for food and clothing.

Stories of his numbers are numerous. No one could with any accuracy estimate his population, but his early migrations were stupendous. Captain Newcomb, an old Yukon River pilot, tells of being held up near Circle, Alaska, by a herd that was estimated at several million. Vilhjalmur Stefansson, in his *My Life with the Eskimos*, tells of a migratory herd that trampled down the growth to a width of three miles, and was several days in passing. Carcross, Yukon Territory, Canada, was so named because several million caribou used that path as one of their routes in their yearly trek.

Curious is so named because he never fought back, or ran either, but often, to the amazement of the uninitiated, would turn and trot toward the hunter, with a "Welcome to our fair country" look on his face. Even today, despite his many sad experiences, he will casually watch anything that does not approach on two feet, be it a roaring outboard, a plane, a dog team of yipping malamute with a driver and hunter, or a person who is crouching and rather hopping along.

Curious is not a large animal. Of his many varieties the largest reach only about four hundred pounds, and stand about four and a half feet at the shoulder. The old bulls have a fine antler spread, peculiar because of the two shovels or spades, as they are called, extending at right angles to the forehead. These are used to dig down through the snow to obtain the lichens he likes so well. He travels in small bands after the mating season, but still is the same optimist. Wolves force him off the wind-swept mountains into the snow-filled valleys and pick him off at their leisure, natives crowd him into the open, and now war construction is rapidly cutting him off from his only refuge, the miles and miles of uninhabited country of Yukon Territory, and the interior of Alaska.

With construction of pipelines, refineries and highways in the North, cutting him off from his natural mating grounds, he has had to change his habits. For the past few years, the migratory herds have been small along the upper Yukon, and this past fall they consisted of just a few stragglers.

There has been no mass killing, such as those decimating the great herds of "the Monarch," nor has this sad episode produced any character known as "Caribou Jones" or such, but just a constant sniping by civilization has taken its toll. Stefansson reported that the Arctic Coast herds had been almost wiped out as far back as 1903 by meat-hungry whalers, who paid the Eskimo hunters to supply them.

Regulations have been set up by the Department of the Interior in Alaska limiting the season and the number killed, but enforcement is a very difficult thing in a territory so large and so thinly populated as Alaska. Then too, the law has a loophole, providing that in case of need of meat, an animal may be taken. This loophole is very much overworked. A year ago a fellow came in with a cow caribou in August, and was able to look me in the eye, while claiming that he shot it in the river, because it tried to clamber on and threatened to swamp his boat. So he really shot it in self defense. (It is also provided, that an animal may be shot in case it attacks. This is especially applicable in the case of bear.)

Some argue that wolf bands are on the increase, and this accounts for the cutting down of the herds. This may be true to some extent; wolves are on the increase, but human wolves have had greater influence in the slaughter.

Every spring before the ice goes out in the Yukon, small bands come down from the mountains heading south toward their calving grounds in the higher mountains of southeastern Alaska and British Columbia. When they reach the broad stretch of the Yukon they usually slumber for a while on the honeycombed ice. Traveling down the Yukon any day in early May, you may encounter ten or twelve small bands of fifty, more or less, basking in the sunlight, nuzzling into the melting snow and ice, in perfect security because they are out in the open and seem to understand that their natural enemies will not pursue them onto the uncertain ice. They rest there, the cows heavy with calf, and happy to be at ease, and the bulls welcoming the cool security of the ice after the hard dangerous plow through the melting snows of spring.

This past spring the natives reported a surprising number of carcasses, sometimes whole herds, on the ice. On investigating a herd that was found near this village, it was discovered that they had all been killed by high powered bullets in the back and head. They proved to be from fifty-caliber shells, of the type used in the machine guns of our fighting forces. Some "sporting" pilot had an itching finger and "buzzed" a few. This was not an isolated case, but was reported by prospectors and natives as having occurred all over the country; they found not only caribou, but moose and bear that had been used as moving targets.

The disappearance of "Curious" is especially regretful, because many people are still dependent upon him for food. It could even mean, in the extreme, that a proud and now independent people might become virtual wards of the government, just as many natives did with the wiping out of the buffalo herds. The natives, and for that matter the "sourdoughs" of the cold interior of Alaska, have never found a suitable substitute in this climate for caribou skin boots and parkies. They still use caribou rawhide for harnesses and ropes for their indispensable dog teams. Rawhide, known as babiche, for filler for snowshoes, and sinew for sewing comes from his back.

The natives cannot be whitewashed entirely for their part in the crime either. They feel no compunction about killing gravid caribou in the spring, explaining that they have always done so, that they need meat, and that the caribou are theirs. I have encountered several too lazy to fish during the summer, who have fed their dog teams with his meat during the winter, and a dog team could consume a great number.

With the excellent results that conservationists have had with ducks, geese and other forms of wild life, and with what we have learned from the slaughter of the buffalo, it seems that with publicity and education something might be done to save this harmless species before it is too late. Both Curious and The Monarch suffered the publicity of "countless legions;" in both cases "there were so many they couldn't be wiped out," but, sadly, we have learned, OR HAVE WE?

Rampart, Alaska. Robert C. Fisler

Biology and Conservation

With its December, 1943, issue *The American Biology Teacher,* official publication of the National Association of Biology Teachers, publishes the first unit in a series of conservation units for the biology teacher. This is the work of Dr. E. Laurence Palmer and is entitled "Seven Keys to Wildlife Conservation." Once again this publication scores with recognition of the intimate relationship between biology and conservation.

Waltonian Meeting

The Izaak Walton League of America will hold its Twenty-second Annual Meeting at the LaSalle Hotel in Chicago March 30, 31 and April 1. Many important conservation issues will come before the meeting, not the least of which is the vital importance of closer coordination in the administration and use of our water resources. An outstanding program has been arranged, indicating the importance of conservation in wartime.

More Johnsonia

Fifty-two pages, and Numbers 10, 11 and 12, have been added to *Johnsonia,* the cumulative publication on shells published by the Department of Mollusks of the Museum of Comparative Zoology of Harvard University at Cambridge, Massachusetts. Number 10 is written by Isabel Pérez Farfante and covers the genera *Fissurella, Lucapina* and *Lucapinella* in the western Atlantic. Miss Farfante also provides the material for Number 11, dealing with the genus *Diodora* in the same waters. W. J. Clench and R. T. Abbott collaborate in Number 12 to discuss the genera *Gaza* and *Livona,* also of western Atlantic waters. Since publication of Number 1 in October 1941, there have been published 180 pages of *Johnsonia,* invaluable to any shell student.

Evergreens

Colorado Evergreens. By Robert E. More. Denver. 1943. The Colorado Museum of Natural History and the University of Denver. 48 pages. Illustrated.

This attractively-illustrated forty-eight-page booklet describes and pictures the seventeen distinct evergreens of Colorado. The text is condensed and popular and much reliance for identification is placed upon the excellent pictures.

Spruce Not So Good

Commenting on Dr. E. Laurence Palmer's recommendation of Norway spruce as a Christmas tree, Arthur Dummett, Mount Vernon, New York, nurseryman, says that in his opinion Norway, of all the spruces, is the least desirable due to its habit of dropping its needles. Mr. Dummett says that balsam is the best seller and the most profitable, adding that any of the firs—balsam, Fraser or Douglas—are better than Norway spruce.

Great Lakes Verse

Rimes from the Great Lakes. By Flora Slayton Reichle. Detroit. 1943. Published by Lewis Reichle. 68 pages.

Between the paper covers of this little book are gathered forty-three poems about Nature as it is encountered on the Great Lakes. The poems are simple and direct word pictures that seek to express an appreciation of life outdoors and succeed admirably in achieving this.

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Under the Microscope

By JULIAN D. CORRINGTON

CHEMICAL CRYSTALS

Among non-biological subjects for the microscopist, few are equal in beauty and interest to chemical crystals. Those of our readers who have never watched the process of crystallization under a lens are therefore urged to perform the very simple experiments discussed this month.

Some technicians prefer the method of fusion: to melt with gentle heating a small bit of a solid salt on a microscope slide, then observe crystals form as the mass cools. Others add the dry salt to hot water (solution method) and watch crystallization take place as the solvent evaporates. As a beginning, put a small amount of very hot water in a container and add as much table salt (sodium chloride) as will go into solution (saturated solution). Hot solvents can take up more of the solid than cold ones, hence as the liquid cools it throws down (precipitates) the excess amount which it can no longer hold; the solution becomes supersaturated. Place two drops of the hot saline solution on a clean slide and examine, noting that the cubical crystals form first around the edges, where cooling is most rapid. Try both low and high power and watch the crystals grow, paying attention to the intricate pattern of etchings on the sides of the cubes, no two of which will appear exactly alike. Repeat, using a cover glass. On a third slide, add two drops, then immediately spread the water into a film by using a warmed needle as spreader, and examine at once, either covered or uncovered. Any of these methods works well; it is a matter of personal preference as to details followed.

For a permanent slide, allow such a preparation to dry thoroughly, then add balsam and a cover glass. Or use the fusion method, which is speedier in that no water is involved. Some crystal slides keep well, others deteriorate rather quickly. Wherever possible both observations and photographs of crystals should be made with polarized light in addition to ordinary light, as the former usually reveals structure, or beauty of form and color, not otherwise evident.

Try potassium permanganate next, a chemical that crystallizes in long, slender needles, deep purple in color. Potassium bichromate forms an intricate, forest-like pattern of orange-red crystals. Pyrogallic acid and hydroquinone are two substances found in every photographic developing room, and both make fascinatingly beautiful crystal designs.

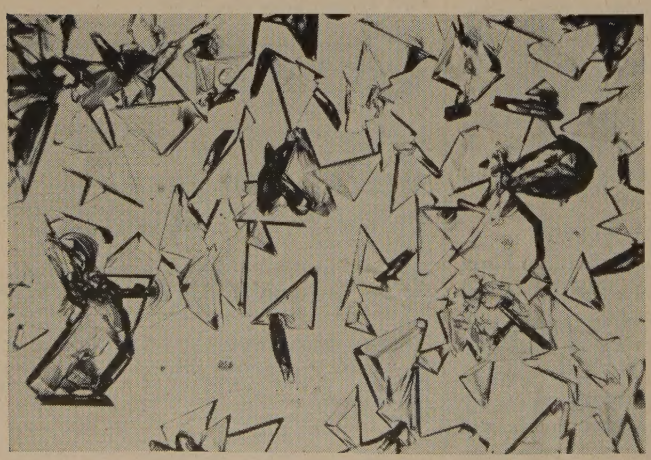
Our illustrations show tartaric acid, an organic compound that lends itself well to a number of experiments, since its behavior depends on its environment. Made by the solution method, small and regular crystals appear, but by the fusion method the outcome is wholly different. Prepare first by dissolving in hot water and allowing to crystallize out on a slide, as was done with table salt. Next, melt some of the material on a slide with gentle heat and spread the resultant fluid into a thin film with a heated needle; allow to stand 30 seconds, then draw the needle point through the film; crystallization then starts from this needle scratch and assumes a markedly different form. Now prepare a saturated solution in hot water, as before; place a few drops on a slide and keep warmed to hold in solution. In the center of this pool place a very small drop of a hot saturated solution of bicarbonate of soda. When crystallization occurs, both chemicals will be seen, together with a third form at the junctions of the two, representing their compound.

Another substance that behaves differently according to treatment is sulphur. Remembering that fumes of this element are noxious and, in large amounts, poisonous, slowly melt a small amount of sulphur in a porcelain dish or lid of a baking-powder can, then allow to cool and solidify. This process begins around the margin; when the edges are solid but the center still liquid, pour off the central fluid. The crystals revealed are pale yellow, transparent, long monoclinic needles, which, unfortunately, are not permanent, passing into the next form on standing a while. Natural crystals of sulphur are rhombic octahedra, and are best prepared by the solution method, using carbon disulphide this time as the solvent instead of water. This reagent is highly inflammable and explosive, so make certain that there are no open flames in the vicinity.

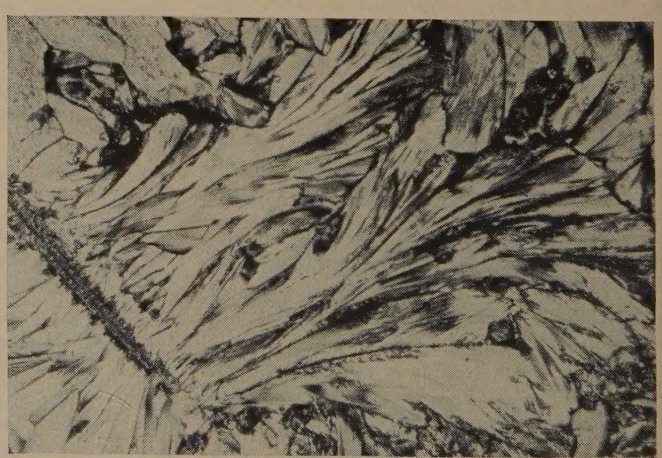
Most elaborate in both pattern and color are the crystals of organic compounds and, of these, hippuric acid has long been a favorite. To prepare, saturate in absolute alcohol, warm, then place a drop on a slide. For a permanent mount, use castor oil or natural balsam; xylene balsam will not serve, as xylene is a solvent of these crystals. Castor oil is a preferred mountant for crystals soluble in the usual reagents.

Still another type of experiment is that of causing a chemical reaction directly on the slide. Mix two drops each of calcium chloride and zinc sulphate, hot aqueous saturated solutions and, on cooling, observe the formation of needles of calcium sulphate.

Chemical crystals are among the best of all subjects for photomicrography, especially for beginners. Though three-dimensional, most crystals are so minute as to present an essentially flat field; they are motionless when fully formed, and either



Tartaric acid crystals prepared by solution method and photographed by ordinary light.



Tartaric acid crystals prepared by fusion method and photographed by polarized light.

Tartaric acid crystals with the addition of sodium bicarbonate, photographed by ordinary light.

are colored or so refract light that they present good contrast. The majority show up best when polarized light is employed, or, at any rate, comprise some of the most attractive objects for use with this form of illumination. Many, especially the organic crystals, are gorgeously colored, and will yield exceptionally beautiful Kodachrome films and, most fascinating of all, colored motion pictures of crystallization. One observes the shooting out of delicate traceries and frost-like patterns in amazing complications of brilliant reds, oranges, greens, and blues; an optical treat well worth preserving on film.

TRADE NOTES

The first American history of the botanical sciences has appeared, constituting Vol. 7 of the "New Series of Plant Science Books," published by Chronica Botanica. Howard S. Reed, author of *A Short History of the Plant Sciences,* is Professor of Plant Physiology in the University of California, and has given us a most comprehensive yet succinctly written story of the gradual development of all aspects of the subject. Beginning with remote antiquity and coming right down to the present, this interesting volume recounts the human side of the manifold discoveries that have brought botany to its current elaborated estate.

Here one may read of the advanced stage of culture of maize and potato practised by Central and South American Indians at the time of their discovery by Europeans; of the founding of botany as a science by Theophrastus; of the herbalists of renaissance Europe and of the Orient; of the first microscopical studies in plant anatomy by Malpighi and Grew; of gardens throughout the ages; of growth in our knowledge of plant structure and function, the utilization by plants of water, carbon, nitrogen, and minerals of the soil; of fungi, including bacteria, and the phenomenal rise of plant pathology; of explorations and the acquisition of information concerning plant geography and ecology. Historical illustrations and references to the literature are provided. Whether interested chiefly in history, general botany, agriculture, horticulture, pathology, or medicine, the reader will find this book a mine of information and absorbing in its unfolding of a most important chapter in human achievement. Pp. vi, 323; figs. 37. Waltham, Mass., the Chronica Botanica Co., P. O. Box 151; New York City, G. E. Stechert and Co., 31 E. 10th St., 1942. $5.00.

We are very favorably impressed by a new general biology text, *Man and the Biological World,* by Rogers, Hubbell, and Byers, of the University of Florida. Primarily intended for use as a survey text for the non-professional student in a year's course at the freshman level, the needs of those who will take advanced courses in the subject are not neglected, as there is plenty of meat in this book. Exposition of the material centers around an examination of the organism, with main emphasis on man, from four points of view: the organism as an isolated individual—structure and function; the organism as a member of a continuous stream of life—reproduction, heredity, and variation; the organism as a product of evolution; and the organism as a unit of its physical and biotic environment—ecology. The appendix presents a taxonomic survey of the two kingdoms, a reading list, and glossary.

Especially notable is the comprehensive treatment of paleontology; here, at last, is a general biology text that considers this subject an important and integral portion of the whole story,

References for the Microscopist

(Third List)

In previous issues we have offered a number of important texts and reference works on the microscope, microtechnique, and various background sciences. This third listing includes five additional subjects, all of them important to the microscopist who wishes to build on firm foundations. We suggest you add some of these titles to your library; mention them to friends and family as suitable remembrances; note them as gifts for that fellow microscopist.

CRIMINOLOGY

Finger Prints, Palms and Soles, by Cummins and Midlo. New and complete general work; all aspects of subjects, criminological, biological, historical ----------$4.00

EMBRYOLOGY

Fundamentals of Comparative Embryology of the Vertebrates, by Alfred F. Huettner. Best and most recent general comparative text, beautifully illustrated ----------$4.50

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HISTOLOGY

A Text-Book of Histology, by J. Lewis Bremer. Fifth edition of one of the most widely used standard texts ----------$6.50

Handbook of Microscopic Characteristics of Tissues and Organs, by Karl A. Stiles. Practical laboratory companion for identifications --$1.50

MYCOLOGY

Textbook of Mycology, by E. A. Bessey. Complete work on classification, structure, life histories of the fungi ----------$4.00

The Advance of the Fungi, by E. C. Large. Important and fascinating account of warfare between fungi and man; how fungi have shaped human civilization; for readers of all classes ----------$4.00

PARASITOLOGY

Parasitology, by Hegner, Root, Augustine, and Huff. Comprehensive coverage, authoritative, highly interesting ----------$7.00

Clinical Parasitology, by Craig and Faust. Medical reference work on parasites of man; recent, exhaustive, standard ----------$9.00

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challenging the right of authors of geological texts to arrogate to their provinces exclusive possession of this field. There are seven chapters in all on space and time distribution, culminating in anthropology and ethnology.

Treatment of separate topics is brief, yet the style is unusually interesting and readable. By way of criticism, there are typographical errors to iron out, the last half of the book badly needs many additional illustrations, and we believe too many advanced technicalities have been introduced here and there, not conforming to the announced plan to appeal to the general student—especially true in the section on genetics. This text probably integrates human and general biology to better effect than any other we have seen, and should be examined by everyone interested in such a teaching design. Pp. x, 607; figs. 180. McGraw-Hill Book Co., 330 W. 42d St., New York, 1942. $3.50.

This month we have an excellent new item for those interested in astronomy and physics. *Atoms, Stars, and Nebulae,* by Leo Goldberg and L. H. Aller, is the ninth and latest of the Harvard Books on Astronomy, a series for the layman as well as the professional. Here are described many kinds of celestial objects, the reader sharing in some of the thrill of discovering, via telescope and spectroscope, something of the ways and nature of hot and cold stars, binaries, pulsating, exploding and other stars, and of nebulae, interstellar gas clouds, and outer galaxies. Astronomy has gone a long way indeed from the picture book presentation of popular facts of a generation ago, and today one simply *has* to learn something of modern nuclear physics to grasp even the fundamentals of the science. We cannot agree with the publisher's statement that certain parts are non-mathematical or non-technical, but we do feel that the authors have done a splendid job in making the subject intelligible to that subtly wooed character, the "intelligent layman."

The manner in which the astronomer discovers the distance, size, mass, temperature, luminosity, and composition of a star is readily understandable, likewise the explanation of the structure of the atom and how one element is transmuted to another is admirably clear. There is, however, a very considerable amount of stiff going for the average reader, unavoidable if the subject is not to be emasculated. As with so many modern fields of enquiry, you have to have something on the ball if you want to play.

Many fine illustrations help one over the rough places, while portraits of leaders in the variously concerned fields of research add to the human interest in this great story. Those with sufficient background will find the entire volume most enjoyable and thoroughly up to date and authoritative; others may skip difficult portions with no great loss to a general understanding; anyone who wishes to keep abreast and find out what astronomers and physicists are up to these days will profit greatly by reading this book. The microscopist will derive many new concepts of the nature and behavior of light. Numerous appendices present technical data for reference. Pp. v, 323; figs., frontispiece, 150. The Blakiston Co., 1012 Walnut St., Philadelphia, 1943. $2.50.

The 7th edition of Professor Jesse F. Williams' well known *Textbook of Anatomy and Physiology* represents a considerable revision and rearrangement over former issues. The volume is smaller, the customary separation of anatomy and physiology has been broken down by a praiseworthy interweaving of the two aspects, and there are many new illustrations, including six new color plates.

We note up-to-date discussions of vitamins, hormones, blood typing and transfusions, and a comprehensive table of muscles as new features. The older procedure of presenting first cells and then tissues has been abandoned in favor of interlarding this information with a discussion of the organs concerned, integrated with an exposition of their psysiology. Each chapter ends with review questions, practical exercises, and how-to-study hints, and there is an excellent glossary as well as a full index. The writing is condensed, precise, interesting; the illustrations numerous and excellent. This is one of the very best works on human anatomy and physiology for the biologist and general student. It provides splendid background material for the microscopist. Pp. x, 573; plts. VII, figs. 344. W. B. Saunders Co., West Washington Square, Philadelphia, 1943. $2.75.

The reviewer of scientific literature is always intrigued by the task of reading a new Zoology, to see what fresh slants may appear on a subject that is old but ever new. The first edition of *General Zoology,* by Professor Tracy I. Storer, is certainly the most comprehensive and exhaustive work of this nature we have seen, and represents a tremendous amount of carefully executed work. The ground plan is first to present the frog as a typical animal, then to detail general facts and principles in Part I, followed by a survey of phyla in Part II. In the first half, after an introduction, and ample coverage on the frog, there are chapters on protoplasm, cells, and tissues; organs and organ systems; reproduction and development; heredity and genetics; ecology; distribution; evolution; history; classification and nomenclature.

The author has designed this volume as an introduction to zoology, but it appeals to this reviewer rather as an encyclopædic reference. The amount of factual information crammed between a single pair of covers is enormous, and we cannot conceive of a beginning student mastering more than a small fraction of the contents in a single year of work. Our chief complaint is of the same nature one so frequently hears in connection with high school texts incorporating too much information from the college level. Professor Storer, we believe, has skimmed all of the cream from every advanced college course in zoology in an attempt to bring them to the introductory level. If a student could actually assimilate the whole book in one year, he would need go no further and would know more than most of his teachers. As a text, then, we feel this volume to be so advanced and so comprehensive as to appall the average student, who would despair of ever completing the 33 chapters.

As an advanced text or reference, or a companion volume for a three- or four-year course in the zoological sciences, the book is a distinct contribution, beautifully written and illustrated. The information is thoroughly up to date and very well explained; the author is never dull or prolix or ambiguous; most of the illustrations are new and splendid. At the list price this book is indeed a bargain; a general text, an invertebrate and a vertebrate zoology, an entomology, a parasitology, etc., etc., all for the cost of one. We can recommend it most highly for those of our readers who wish a thoroughly reliable and complete work on the animal kingdom, both for students and laymen. Pp. xii, 798; 5 colored plts., figs. 551. McGraw-Hill Book Co., Inc., 330 W. 42d St., New York, 1943. $3.75.

A. S. A. M. NEWS

Out on Long Island, a new Chapter of the Society has just been started. The group has chosen as their designation, the Walter Reed Chapter, and they become the fourteenth or Xi Chapter of our organization. Members and prospective members residing in the general vicinity and who are interested, should contact Harold Williams, 35-46-65th St., Woodside, N. Y.

Readers would be surprised, if they could peek over our shoulder as we read our mail, in discovering to what an extent our members in the Armed Forces continue use of their microscopes. Every week brings several instances, from camps in every section, and even from shipboard. Pharmacist's mates and medical orderlies obviously maintain some connection with microscopy, but many others in non-scientific divisions manage somehow to keep up their hobby. Also, we are ourselves amazed at the number of new members in the various services recruited each week. Our V-mail increases; the A.S.A.M. is represented on every front. "Please forward my *Bulletin* to the following address, I don't want to miss an issue," is a frequent request.